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ABSTRACT

This report describes a comparative study of methods of home-based infant and parent education. The study involved 108 children, aged 1 to 2 1/2 years, in six groups of 18 each. In three groups a home visitor worked with the children and their mothers using a curriculum which focused on either play, language, or social development. In a fourth group, the home visitor used elements of all three curricula with the mother only. In the fifth group, similar curriculum elements were used by the home visitor with the baby only. A sixth group (control) consisted of babies who were tested but not visited. Children were tested at 12, 18, 24, and 30 months of age for curriculum effects in language development, mother-child interaction, and cognitive development as evidenced in play. An in-depth comparison of subject performance in the six groups is provided. Extensive appendices, comprising most of the report, include sample recruitment procedures, demographic characteristics, and correlational analyses of demographic variables. In addition, extensive descriptions of the curricula, laboratory procedures, measurement techniques, and coding manuals are included. (BRT)

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Final Report

Variations in Home-Based Infant Education: Language, Play and Social Development

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in collaboration with

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Yale University

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CHAPTER 1: THE CONSTRUCTION AND SELECTION OF ENVIRONMENTS

Background of the Study

The study -- or better, the enterprise -- that we describe in the following pages has many tangled personal and conceptual beginnings; it is only the clarity of looking back that permits us to state some of the more important ones. What the enterprise became, in the end, was a six-group study of home-based education for about one hundred children between a year of age and two and a half. It started quietly. We, all of us, recognized that the second and third years of life were busy ones developmentally, when the child achieves that subtle transition from baby to person. We also, though with different force from one to another, felt that the centers of that developmental transition were language, play, and social development. Each of us believed, in addition, that there ought to be some way of bringing the orderliness and clarity of the laboratory into natural settings -- a conviction that has been sorely tested and blunted in part but which remains our bulwork, however battered, against the forces pressing toward some variant of the uniqueness argument -- the impenetrability, the ineffability of human personality. More on that issue later. What we were not prepared for was the unique demand in studies of early education for a shifting focus, for taking at least three different points of view toward what we were doing -- often in rapid succession, and, occasionally, simultaneously.

To study the child at home, you have to be a developmental psychologist, calling on your knowledge of data and ideas in the field. To influence that child at home, you have to be an agent of change, a persuader and communicator. Some of the issues here are, to be sure, technical but, far more critically, the issues are normative and moral. Finally, to judge your impact, you have to turn your back on your earlier activity and become assessor and evaluator, now coldly indifferent to the historical justification of the study. Clearly a tangled net, but in it are caught all serious students of early education. If we tried to find our specific place in the net, incidentally, it would be more in the developmental research corner than in either the teach and change corner or the test and measurement corner.

Now in this knotted skein of issues, one that confronted us early and often was the painful question of the morality of what is called, in its ugly way, "intervention." We had seen enough of, and sad to tell, been enough of, the plantation liberal -- let us go repair the disadvantage of the poor folks -- that we were wary to the point of paralysis on the issue. Our approach to a solution had two main components -- first, we sidled up to our educational curricula very slowly and second, we organized the curricula around strategies for the mother rather than around specific behaviors, theories, or instructions. Let me say a word about each of these themes because they have relevance to our methods as well as to our sensitivity about the morality of intervention. Two relevant steps preceded our design of curricula for babies in homes.

Stage one. Two independent studies were carried out in New Haven several years ago, one by Clarke-Stewart (1973) on the interaction of young babies and their mothers, the other by Katherine Nelson (1973) on the early development of language in children. These studies provided us with some guidelines for our later observations and with some important messages about method.

Stage two. Before we put together anything that could be called curricular, we set up three longitudinal studies -- we have called them panel studies -- of play, language, and social development. In other words, the panel studies were our surveys of the terrain, our exploratory probes into the phenomena we wanted to study through later systematic variation. You will not read much about the panels in the report; their importance was in providing us with data -- data collected both in homes and laboratory settings -- that were the raw material from which we fashioned our curricula.

Stage three. Only after we had digested the results of the Clarke-Stewart and Nelson studies, only with the panels leading the way did we begin to put together our educational programs, the central part of our work that you will hear about shortly. Let me first say something about the notion of strategies of our early education. It is the most important message we have to bring to you today.

Strategies of Early Education

Slowly, all too slowly, psychologists are discarding the image of the child as an input-output system, part of a linear arrangement of the time and events in which something happens in what we evasively call the environment, to be followed by something that happens in what we evasively call behavior. Typically the somethings have been very narrowly defined, with a hope that we have found the right pieces of environment and behavior to represent some grand process like memory or learning or language and, more, that the pieces we had chosen were context-independent, revealing the underlying process unambiguously in the rather restricted circumstances under which we observed them. But that, of course, is not the child at all. He is much more a field of events, complexly interconnected in ways that we can only presently guess at. What seems beyond guessing is that there are several separable theories of the field of child operative when a psychologist looks at or attempts to influence the development of the child in his home. There are, at least, the psychologist's theory of the field (which has evaluative and normative components as well as the analytic ones we advertise), there is the child's theory of the field, (almost the exclusive province of Piaget until the day before yesterday), and there is the mother's (or other caregiver's) theory of the field. Now, We are elementalizing some profoundly important and difficult issues in developmental theory, but we want to provide a framework to hang our study on. We wanted to use our emerging psychological theory of the child's theory to influence the mother's theory of the field of the child. More prosaically, we used the insights we gained in our earlier observations, particularly in the panel studies, to elaborate some general principles about how the child changed over the months between 12 and 30 in the special areas of language, play, and social development. We then, as our major educational and curricular theme, tried to inform the mothers of our sample about the discovered general developmental principles. There are several reasons for such a curricular strategy. First, and often foremost for us, trying to tell mothers what we have found out or believe about babies seems less directive and manipulative than prescribing a set of materials or routines or bahvioral objectives. Of course, it was impossible for the planners of the curriculum to suppress their undocumented prejudices (for example, that it is unwise for mothers to intrude always into the child's ongoing play) and it was impossible for the home visitors not to reveal their attitudes toward children (in particular example, most of our home visitors were shaken by the persistence among our families of what might be called classical attitudes toward gender differentiation). But our focal attempt was to inform the mother about child development, to draw out her goals and intentions for her child, to make her as aware as we could of the intricate relation between her life and the baby's and to (in imitation of our curriculum) intrude on her relation with her baby as lightly as we could. The added joy of such a research procedure is that it can be justified not only on ethical grounds but on theoretical grounds as well. If you believe, as we do, that the parents are the major agents of change in the life of the young American child, and if you have as we do, an image of the child as a field of events interrelated to the phenomena around him, then the basic educational strategy must be to modify the mother's theory of the child in ways that are held to be developmentally benign. In a word, we must change the mother's theory of her child (at least, some mothers;

others, far wiser than we, became informal consultants on the development of curriculum).

At the outset, we recognized that human beings -- especially, perhaps, mother human beings -- are not influenced greatly by didactic manipulations. You don't send them a book, or read them a lecture, or show them a film, and then say, "Now you go do it." But, on the other side, we were not sure what would work. So we adopted a complex strategy with several basic components: Having the home visitor model interactions with the baby, involving the mother as research assistant (keeping records, making occasional observations), and centrally of keeping the notion of interactional strategies in the forefront of the exchange among mother, baby, and home visitor. The home visitor was, therefore, a diagnostician and decision-maker in her own right.

Another word, if you will, on our prejudices of method. The child is not only a complicated field, he is also a highly adaptable one. That is, the social sensitivity of the child is so highly developed during the second year that there are many ways in which the study itself would begin to change him -- his relation to the home visitor, his perception of his mother's attitudes toward the study, the impact of unusual materials and procedures. And, more, let it be said outright, the field of the home visitor is changed too as the study moves along. For this multiplex of reasons, we wanted to see the babies in a number of settings and with a variety of observational procedures. Our encounters with the children ranged from home to laboratory, from parties to experiments, from checklists to developmental tests, from maternal reports to videotapes. We tried to see the child and his mother from as many angles as we could feasibly manage, both because we recognized his likely variety and because we were deeply concerned about the involvement of any particular observer in the process of observation. Our hope, certainly not unique in the field, was to arrange a a "wraparound" of observational procedures that would provide a good first statement at least, of the stability and variety of each child.

Finally, and of central conceptual status, these several procedures gave us an unusual opportunity to address several issues. We did not set out to ask whether or not the child can be changed significantly in the first years of life; rather, we tried to make a first assessment of the susceptibility to change of particular aspects of the child. It is, you see, our conviction that the classical argument about early experience has been wrongly drawn. Our central task as students of the young child is to make a systematic analysis of the possibilities of change -- which will surely vary widely from one behavior system to another -- and to relate that structure of possibilities to characteristics of the child, his parents, the setting of his early life, and, at last, whatever educational innovations are made in his first years. The final answer on the effects of early education will not be "yes", "no", or "maybe" but rather will be an elaborate matrix indicating the likelihood that particular aspects of the child can be influenced in particular dimensions by particular kinds of situational or education change.

Design of the Study

Now, let us sketch out the educational study that grew from our interest in young children.

There are three groups of primary interest -- children who are seen with a curricular concentration on play, language, or social development. For each of these groups, there is a three-way exchange among mother, child, and home visitor. The home visitor goes to each home 32 times, first on a weekly basis then on a two-weekly basis, and then once a month. The basic theme of the curricula is easily stated -- to inform, to involve, to commit mothers. We saw the families in three replications of 6 babies each. Thus, we began with 18 children in each of the three curriculum groups.

In addition to the three groups of primary interest, there are three comparison groups, two serious, one proforma. In the two serious comparison groups, elements of the curricula are brought into the home but not in a way that will commonly involve mother, home visitor, and child but only two of the three. Thus, the comparison group called Mother - Only is one where the baby is treated politely but not as part of the team (the analogy is obvious to the social worker) and in the second, the home visitor concentrates on the baby with the appropriate materials but keeps the mother at a polite distance (the analogy is to the baby teacher). Both these groups, let me emphasize, are designed to assess the impact of our materials when the exchange is two-person mother-home visitor or two-person child-home visitor rather than the three-way arrangements of our primary groups. Finally, there is the required test-only group, which gets a periodic assessment but no home visits. We recognize that this is, like others have been elsewhere, a risky design -- any conversation with a lonely young mother may have the same commanding effect -- but we think it the right way to test propositions about the differential effect of different patterns of exchange with mothers and babies.

Thus, the full design involved some 108 children in six groups of 18. In addition to his thirty odd home visits, each child was seen in our laboratory or in his home several times over the 18 months of his involvement with us for systematic assessment (at 12, 18, 24, and 30 months) -- probes of changes in his behavior that might reflect curriculum effects.

As you might guess, quite a few people have been workers in the study. In order to reduce the impact of observer variation on the data, we arranged for every home visitor to see babies in all experimental groups. In other words, a home visitor would see a language baby, a social baby, a play baby, a Mother - Only baby and a Baby - Only baby. Further, we have tried to schedule assessment observations in such a way that babies are seen by members of the staff who have not seen them in the homes and who do not know their group assignment. Of course, to the happy degree that our curricula made any difference, to that degree the observers can detect which group the child comes from. Let us underline here a couple of points hinted at earlier. First, the variety of humanity in its second-year forms is so great that any educational intervention is, on the face of it, unlikely to make a dramatic differential impact. We had mothers and babies marvelously sensitive to playful exchange but they were in the language group; we had responsive speakers and listeners in the social curriculum and so on. We are persuaded that, if you did not hold us to random assignment and let us instead make the assignment of babies on the basis of one or two shot observations, we could show spectacular group effects. But, seriously, facing the wealth of diversity and having available only our present knowledge, we recognize with so many other early educators that we are at best adding a flute obligato to a fully functioning natural symphony when we bring our curricula to the homes of one year olds. The second point is the commanding character of the baby as a unit of observation. Our observers and home visitors became sophisticated students of young children and they well understood the analytic task of tying to make sense of variables, of differences among groups, of variation in standard test and observational instruments. And yet, when the staff came together to talk about the study, the home visitors wanted to talk about particular mothers and particular children, dividing the world not across psychological dimensions but across specific individuals (to give that abused word its exact due) families. There is, in brief, a unity and integrity and (more to the point) sensibleness about the particular child in his particular family that makes him the natural unit of consideration. We have not solved this eternal problem, either administratively or in terms of method.

There is, as we have already indicated, great diversity of personality, style, and attitude among our families, but on standard demographic measures, they are drawn from a fairly well-defined part of the culture. The mothers' median age is 23, the fathers' 26; two-thirds of the families are Roman Catholic, almost all the rest Protestant; 90% are white, most parents have some high-school education but almost none graduated from college -- correspondingly, a rough occupational classification tags 60% of our fathers as white-collar workers, the rest as blue (see Appendix A, Tables 1, 2 and 3). Finally, and we could spend a significant part of our time on the point, one-third of the children in our study have an older sibling -- a planning flaw which we urge no one to repeat. We saw each baby first almost exactly at his first birthday.

Three core curricula - one on childrens language, another on their play, and another on their social development - provided the content of the home visits. The following brief descriptions have been adapted from Kessen, Fein, Starr, & Clarke-Stewart (in press). Additional descriptive details can be found in Appendix B.

The Language Curriculum

Unlike social development, and, to some extent, the development of play language is a frequent subject of contemporary early education curricula. Programs like those of Levenstein (1970), Painter (1968), and Schaeffer (Schaeffer & Aaronson, 1972), were devoted to improving the vocabulary and syntax of children from one to two and a half. The curriculum reported here shares one major goal of its predecessors: a focus on vocabulary skills.

In addition to promoting vocabulary, our goal was to help children appreciate the multifold uses of speech. Our research and that of Nelson (1973), indicate that in this period the child becomes aware of the possibilities of language. Some children develop a language orientation toward describing objects. They learn nouns and adjectives. Others focus on social and expressive terms; their speech is devoted to expressing needs and desires. In our research we have also followed the child's growing awareness of language as a tool for communication. Initially speech seems to occur independent of the speaker's need to communicate; then at around 19 months the child becomes aware that speech can be used to tell someone something. Speech now occures most frequently in interactive situations. At 21 months some children make the further discovery that language can be used to communicate with self; language becomes an accompaniment to play. Finally at around 2 years speech use is activated by both the needs of the speaker and those of the listener. Some children direct speech toward another when the other is listening and toward themselves when no one is listening.

The work of Loban (1966) and Bernstein (1970) suggests that the child's early hypotheses concerning the function of language may have important implications for his later ability to communicate effectively with others. A child who focuses exclusively on expressive, social language, for example, might later have difficulty communicating in problem-solving situations. Thus the language curriculum was devoted to familiarizing the child with all the roles which language may perform.

Like the program of our predecessors, we regard the mother as the major source of linguistic information for her child. Her speech and activity are the primary variables through which we can affect the child's language. Operating from a Piagetian framework, we believe that the essential function of maternal speech was to provide a source of information to which the child must accommodate his growing knowledge of language. The child's language changes radically in this age span. If the mother's speech is to provoke accommodation, it must also change.

Yet little is known of the precise characteristics of maternal speech which serves this function. Some tentative prepositions were made in formulating the curriculum. In the early stages of language acquisition, research suggests that the mother acquaints her child with both the referential and expressive functions of speech; language can be used to describe the world and to make social contacts. In this period we encouraged the mother to describe the child's activities to him as they occur so that he may see this as a proper function of speech. She also used language in social games in order to suggest its expressive function.

As the child starts to speak the emphasis of the curriculum shifted from the child's hypotheses about the function of language to the development of language itself. Our research and that of others (Nelson, 1973; Pfuderer, 1969) suggests that the crucial charateristic of optimal maternal speech now becomes its responsiveness. At this stage we encouraged the mother to base the content of her speech on the focus of the child's attention and the complexity of her speech on the child's level of understanding. We encouraged her to be sensitive to his incorrect and tentative classification system. When he misclassifies objects, she responds by gently correcting him. When he calls a truck a car, she says, "Yes, it's a kind of car, that kind is called a truck," rather than, for example, merely informing him, "No, that's not a car."

When the child starts to speak in sentences, the quality of maternal speech apparently changes again (Halliday, 1969). Now the mother engages her child in dialogues, asking him questions, responding to his speech and asking him new questions to elicit more speech. By her example she teaches the child how to engage in adult conversation. Our data suggests that responding to what the child says is particularly important. Presumably the mother's expression of interest encourages the child to initiate conversation himself.

The Play Curriculum

The play curriculum is linked to the oldest but perhaps most fragile tradition in early education. Since the 17th century, philosophers have defended educational schemes based on the importance of physical acitivity, sensory stimulation, and experiences with ordinary, everyday objects for children's development. The opportunity to observe and manipulate a stick, a leaf, a cup, a shoe, -- simple encounters with natural or people-fashioned things -- have been held to be essential experiences for the development of mental life. At least two issues divided these early viewpoints. The first issue was how thing-ideas were represented in the child's thought. Pestalozzi's position was perhaps the most static and physicalistic, whereas Dewey's was the most dynamic and functional. The second issue was whether planned adult intervention was necessary or beneficial. Here Rousseau emerged as an extremist on behalf of the child discovering the world on his own, whereas Pestalozzi eventually became the creator of a graded, adult-managed curriculum. Clearly, these issues are with us still today.

The goal of the play curriculum was conceptualized as the elaboration of possibilities. For the child, this means the elaboration of varied activities -- the probes, tests, and finding out procedures from which the child derives his knowledge of the complex interrelations among the properties of things, actions, and consequences. For the mother, it is the elaboration of the child's opportunities to encounter an environment suited to his intellectual and physical capacities.

The play curriculum was based on three quite simple assumptions about the implications of play for cognitive development. Consider for a moment the question, "What can you do with a cup?" A child's answer (in actions or words) might be bang it, wave it, fit it into another cup put something into it, take something out of it, drink from it, or use it for a hat. Or, consider the complementary question, "What things can you drink from?" The child's answer might include a cup, and in addition, a thimble, a nutshell, or a paper bag. The first assumption of the play curriculum was that play can be usefully conceptualized as the child's encounters with problems of actions and problems of things; that possibilities can be elaborated on either the activity side or the thing side; that many activities can be performed on a cup and many things can be either banged, fitted, or used as containers. Within this framework, the child's functional knowledge develops at the intersection of elaborated categories of actions and things. The scheme we are proposing is similar conceptually to that used by Wallach and Kogan (1965) and others who have investigated creativity in older children and adults. Recent studies by Yarrow, Rubenstein, Pederson, & Jankowski (1972) and Clarke-Stewart (1973) suggest that the object experiences of young children may have important consequence for intellectual development.

A second assumption of the play curriculum was that qualitatively different kinds of thinking appear in the child's solutions to action/thing problems. For example, the general problem of topological relations is at issue when the child fits one cup into another. Simple ordering schemes are involved when children arrange object in a row; ordering and classifying schemes are involved when children build one tower of red blocks and another of blue blocks. Symbolic schemes, disconnections, and transformations may be involved when the child treats the cup as if it were a hat, when he feed himslef, his mother or a doll from an empty cup, a bottomless tube or a tongue depressor. In varying degrees, these spontaneous play behaviors have been translated by other investigators into standardized test items with specially designed materials, detailed administration procedures, and carefully established performance criteria. The assumption that these behaviors reflect or index intellectual activity is therefore not novel or controversial. More unusual, perhaps, is the added assumption that there is a fundamental tension between two major categories of problems which children pose, between problems which concern things "as they are" and problems which concern things "as they might be." In Piagetian terms we are proposing a tension between the child's accommodation to the physical properties of material things and his assimilation of material things to an intellectual organizational structure.

The third assumption of the play curriculum was that play flourishes in an approving, familiar environment in which the material resources are interesting and diverse, in which the child commands the initiative, adult expectations are scaled to the child's capacities, and "yes-no" rules are clear and skewed toward "yes". In general, the object manipulation and exploration of children during the second and third years of life is enhanced by a change of materials (Mendel, 1958) and is inhibited by the presence of strangers or the departure of the mother (cf. Ainsworth & Bell, 1970). With respect to play opportunities provided in the home, our own observations and those of other investigators (Watts, 1973; Clarke-Stewart, in press; Yarrow et al., 1972) suggest that it is not unusual for children to be barred from cupboards and kitchen drawers, while their own, store-bought toys are inaccessibly housed in a toy chest or playpen. Indeed, toys are in playpens as often as children, and the children and the toys are not always there together. In addition, criticism, correction, pressure to conform to an adult standards seems to dampen children's enthusiasm for materials and to interfere with their openness to the creative potentials of material things. The general tenor of these findings is rather surprising in one respect. The support and elaboration of play does not seem to require initiating, directive, teaching adults. Even the ameliorative program developed by Smilansky (1968) was highly effective when composed of the teacher's extensions and elaborations of on-going sequences initiated by the children. The available evidence thus suggests that the play of young children could be promoted by perceptive and unobtrusive maternal involvement and by a thoughtfully planned material environment.

In sum, the overarching goal of the play curriculum was to encourage mothers and children to appreciate the possibilities of things. The program evolved to implement this goal was based on three assumptions about the play of young children: 1) it is a generative system of action-object relationships, 2) the juxtaposition, in play, of things "as they are" and "as they might be" has implications for cognitive development, and 3) the environmental factors -- both immediate and long term -- which influence the level and diversity of children's play behaviors can be modified by informed, elaborating, and unobtrusive interventions by the mother.

The Social Curriculum

When one thinks about the problems involved in designing a social curriculum, it is immediately obvious why this type of program has not been popular. For one thing, an emphasis on social development is clearly out of synch with the current mood in American education, which stresses cognitive development and the acquisition of academic skills. But even more, there are problems with such a program (1) because it is difficult to conceptualize -- perhaps because we have no universally accepted standards for social development, (2) it is difficult to formulate specific program principles because our knowledge about social development, even more than about cognitive or language development, is sketchy and has lacked a productive theoretical framework, (3) it is difficult, even once conceptualized, to communicate -- unaccustomed as we are to talking about such abstract and diffuse concepts as love and responsiveness -- to implement such a program because it is by its very nature so deeply personal and individual. Consequently, the social "curriculum" described here consists of a collection of rather tentative and exploratory strategies which we hoped would foster children's social development.

The goal of the social curriculum was conceptualized as the enrichment of interpersonal connections -- in particular, and primarily, the connection between the child and his mother. The program did not presume to create bonds -- but to supplement, enrich, and make more enjoyable those which already exist. The mother-child relation is central in the social curriculum because it appears to be the key to the child's social development. Research suggests that it is the most important single bond for children under three, at least for those living at home with the mother as primary caretaker. It is also likely that this relationship critically affects the child's relations with people other than the mother, and is therefore an important factor in the child's continued social development beyond the initial tie.

If we accept the mother-child relationship as fundamental and central in the child's social development at this early age (1 to 2-1/2 years), the main questions then become: what does an ideal or optimal mother-child connection look like, and how can we deliberately foster that ideal?

In answer to the first question, Mary Ainsworth (Ainsworth & Bell, 1970) has provided one vivid glimpse in her observations of children's attachment behaviors in unfamiliar settings. One-year old children range in their behavior toward their mothers in a strange room from totally ignoring her and spending all their time exploring the surroundings, to clinging to her continuously and refusing to be separated. But the optimal attachment behavior appears to be that of children who are able to use the mother as a secure base; they are happy to explore as long as they can return periodically to the mother, especially in stressful circumstances, for reassurance.

Similar patterns of attachment behavior were observed in the study of mother-child interaction which was completed prior to this project (Clarke-Stewart, 197 . In addition, the child's optimal attachment to his mother and his positive involvement with her were positively related to indices of his competence in other spheres of functioning, particularly language and cognitive development. Most importantly, there were three kinds of maternal behavior which were most closely related to the child's competence. They were social stimulation (looking, playing, and talking to the child), expression of affection (smiling, caressing, and speaking warmly and positively to the child), and responsiveness to the child's social behavior (responding immediately, contingently, positively, and appropriately to the child's expressions). However, the child's social behavior at one age was a potent elicitor of positive maternal attention at a later time. Apparently the child's positive social behaviors contribute to the mother-child relationship.

The themes of the social curriculum emerged from these empirical results. On theme was to provide opportunities for enjoyable social interaction between mother and child which promoted mutual smiling, laughing, touching, talking, and eye-to-eye contact. Such opportunities were used to encourage the mother to initiate games and social activities with the child (since such stimulation enhances children's competence) and to maximize the likelihood the child would smile and "turn on" the mother (since the child's social expressions increase the closeness of mother and child). At first, social activities during home visits involved only mother and child. After the first few visits, when the child seemed ready to accept her participation, the home visitor joined in too -- but the mother-child relationship remained central. Later, after 6 months or so, the mother was encouraged to invite father, grandmother, other family members, and, still later, other children to play too. Parallel to this trend of enlarging the mother-child relationship was a trend toward increasing the physical distance between mother and child. The suggested social activities for mother and child became decreasingly dependent on physical contact and increasingly verbal in nature. A second theme was to create situations which would foster the mother's awareness and appreciation of the child's unique individual qualities, his particular abilities, and his increasing maturity -- especially in the area of social relations. The mother was encouraged to give the child greater independence and initiative rather than imposing her own desires and standards on his behavior, and to express her appreciation through positive behaviors to the child. A third theme was to demonstrate to the mother her own importance in the child's development, to convince her of her influence on his behaviors. Attempts were made to sensitize the mother to the meanings of the child's behaviors, to enhance her awareness of her own responses to these behaviors and encourage her to respond immediately, positively, and contingently. The final theme was one of general education or consciousness raising. Mothers were encouraged to think about and helped to articulate there attitudes and goals for social development (for example they were asked to descirbe their notion of an "ideal" four-year old), and then they were given information about alternative ways of looking at issues, alternative roles, styles, and so on. The issues which were thus discussed included sibling rivalry, violence, sex roles, social goals, social rules, and discipline.

A word in conclusion -- you may rightly infer that more than any other curriculum the social curriculum reflects the individual characteristics of mother, of child and of home-visitor. The home-visitor must give more of herself to the interaction -- confidences, openness, frankness, warmth; she must be guided by the mother's goals, tempo, tolerance, receptivity, and ability to comprehend and utilize curriculum ideas; she must be responsive to the child's spontaneous social activities. Far more than in the language curriculum or the play curriculum, the social curriculum relied upon the sensitivity and flexibility of the home visitor.

CHAPTER II THE ASSESSMENTS: VARIABLES AND PROCEDURES

The core curricula considered the child's language, play and social development. The materials grew out of an attempt to understand the available literature in each area, and to translate research findings and tentative hypotheses about children's development into a form which would be communicable to parents. In the process, we found ourselves weaving discontinuous and uneven strands into a far more coherent story of early development than data and theories often warranted. We guessed and extrapolated, with one eye on other developmental psychologists who would examine the plausibility of our inferences and another on parents who would be more interested in helping their children than in the finer uncertainties of our state of knowledge.

The next task was to unpack our curriculum stories--to work backwards from curriculum themes to variables in order to identify relevant and usable measures with which to assess the results of our efforts. The tendency of previous research in infant education to rely almost exclusively on IQ tests or cognitive measures (cf. Levenstein, 1970; Schaffer & Aaronson, 1972; Gordon & Jester, 1972; Fowler, 1972), was clearly not suited to our purposes. We reworked the available literature, used our own preliminary studies, and finally selected recording techniques, situations, and measurement instruments which were appropriate to curriculum issues, different behavioral systems, the ages of the children and the life circumstances of our families. The variables we chose and the methods we used to collect, reduce, and analyze the data are discussed in the following sections.

First, a brief outline of the way assessments were organized. Mothers and children were seen for assessment purposes before the home visits began (pretest-Assessment 1) and at six-month intervals thereafter until the children were 30 months of age. Each of the four assessments consisted of a three-part series of different data collection sessions. At each assessment, the first session of the series focused on language data; mother and child were seen in the home. The second session consisted of naturalistic observations of mother-child interaction in the home. The third session of the series focused on play and cognitive development; mothers and children were observed in a laboratory setting.

Thus, at each assessment, each mother and child was seen a total of three different times, involving a total of 5 to 5-1/2 hours of data collection. The sequence of data collection was constant for all four assessments--first language (home), then social (home), then play (laboratory). Scheduling was arranged so that the social visit (i.e., the home observation) took place approximately two weeks after the language visit, and the laboratory observation took place approximately one or two weeks after the social visit. To complete the three parts of each assessment required approximately 5 weeks, considerable organizational sympathy, regular prayer, and an occasional tranquilizer. Most parents were cheerfully cooperative most of the time; they welcomed unfamiliar observers into their homes, answered endless questions, and braved heat and cold to visit the laboratory. But despite the devotion and patience of parents and researchers, strokes of natural calamity could not be avoided: mothers, children, and researchers became ill, cars broke down, taxis were late, mothers gave birth to babies, families went on vacation. Life and death, troubles and joy, often did not respect our research schedules, and as a result the test series for some families took longer (9 weeks, in one case); on a few occasions the sequence was taken out of order, or successive visits occurred within a day or two rather than the regular one to two week interval. On the average, our attempt to maintain a six month schedule was successful. The mean age of testing was 12.3, 18.1, 24.7, and 30.3 months. Analyses of variance failed to reveal significant main effects or interactions for sex or curriculum groups (see Appendix F, Table 20).

Over the year and a half period, 19 people participated in data collection (14 of whom also served as home visitors), and approximately 8 others helped with coding, tallying, and data reduction. The relatively large staff of trained research assistants made it possible to arrange "blind" testing. Since 7 different people were involved in collecting language data, 6 in social and 6 in play, the influence of individual biases was reduced.

Children's Language

The complexities of language seem enormous but the young child is peculiarly adapted to resolving them. How does he come to understand and speak the language of those who care for him? This puzzle has stimulated a number of detailed studies of children's early language acquisition. A great many interesting issues have been studied over the past decade, some more fruitfully than others. Since our children were being studied from 12 months (before most children speak) to 30 months (when most children do so) our problem was to identify variables likely to be applicable over an age range in which change is more striking than stability.

Vocabulary and syntax--the problem of structural change. In the earliest studies, investigators kept records of children's multi-word combinations and then, to gain insight into children's approach to syntax, attempted to write a grammar which would generate the utterances recorded. Typically, grammars were based on the distribution of words in the speech sample (Braine, 1963; Brown & Fraser, 1964; Miller & Ervin, 1964). Words which occurred in like settings were grouped into classes and rules written which would generate the class combinations actually obtained. These studies gave rise to pivot-open grammars. Early two-word utterances were said to result from the combination of one of a small class of frequently used words, the pivots, with one of a larger class of open words. It was argued that children began with two-word, pivot-open constructions and progressed gradually, by a process of class differentiation and combination, to complete grammars (McNeill, 1966).

Theoretical difficulties and more recent research (Bloom, 1971; Menyuk, 1969; Schleisinger, 1971), however, cast doubt on the usefulness of pivot-open theory. Some children's utterances do not fit this model, and even when they do, it is difficult to establish the basis for the pivot-open classification. The major failing of these approaches apparently lay in their concentration on distributional evidence rather than on meaning. Words were classified as alike because they occurred with other similar words. However, children can use similar word combinations to express quite different meanings. Thus Bloom's (1971) famous example "Mommy sock" which can signify possession of an agent-object relationship depending on the context. Recent studies have tried to write grammars which will not only predict word combinations but will also represent, as pivot-open grammars did not, the different meanings which similar combinations can convey (Bloom, 1971; Brown, 1973; Schleisinger, 1971). However, multi-word combinations are the second phase of language acquisition, beginning at about the age of 20 months. Although Brown (1973) has summarized approximately 20 studies of early syntax, lending considerable coherence to the results of previous research, his summary begins when syntactic constructions have become prevalent.

The growth of children's vocabulary, the accumulation of 200 to 300 words, is one of the more striking developments of the second and third years of life. The first phase of language acquisition, usually lasting from 12 to 30 months, is characterized by the development of words rather than syntax. During this phase, the child amasses a vocabulary of between 25 and 100 words. Recently, Nelson (1973) has explored the first words children learn. However, Nelson's study ends its detailed analysis as syntax begins.

The lag between these studies poses serious though not unsolvable problems for the assessment of language development between 12 and 30 months. It is a case in which the qualitative structure of the child's performance undergoes substantial change but the research ideally requires a single unit of measurement able to represent the continuity between earlier and later forms. In order to assess the outcomes of the present study, it was necessary to construct a single measure of the child's level of language production which could span an age range in which language changes from largely unintelligible utterances, to single words, to complex multi-word combinations.

In the study of syntax the accepted unit is the mean length of utterance (MLU). Generally this is computed according to the rules given by Brown (1973). This unit has the advantage both of widespread use and of providing an easy, if global, representation of most aspects of linguistic complexity. Unfortunately MLU is not applicable to the period prior to sentence production. All children, no matter what the size of their vocabulary, receive an MLU of 1.00 if they speak at least one word and no sentences. Moreover, a child who uses one sentence and produces ten different single word utterances will receive a higher MLU than a child who uses one sentence and fifty different single word utterances.

In the study of vocabulary, on the other hand, there appear to be two possible units of measurement. One is the number of different words used, the other the simple number of words. To allow for variation in productivity, the number of different words can be converted to a type/token ratio (number of different words/ total number of words). Number of words can be converted to a proportion of total utterances.

For the study of vocabulary the number of different words has advantages over the simple number of words. The number of different words provides an indication of the size of the child's vocabulary which is uninfluenced by any variability in children's tendencies for repetition. Eliminating repetition is particularly important when comparing the ease with which certain children learn to use types of words. Some classes of words may, as will be discussed below, lend themselves to repetition more than others. Unfortunately, the number of different words is not particularly useful as an index of the development of syntax. Not only is it extremely time consuming to compute, but in some sense it penalizes more advanced speakers. Advanced speakers use copulas, past tense endings and other inflections which, although reflecting their advanced syntactic status, can be used in most utterances. Thus they use a smaller proportion of different words per total words spoken than do children who do not use such inflections.

Fortunately, in early speech the number of different words and the total number of words are highly correlated. When sentences begin, the number of words per utterance is closely related to MLU (number of words per utterances using words). The number of words per utterance (hereafter referred to as proportion of words) thus provides a compromise; it is a unit of measurement which can be used for representing both the level of vocabulary development and the acquisition of syntax.

There are technical problems as well. Research on early vocabulary development has generally relied on parental reports. The majority of these were constructed by linguist or psychologist parents who kept careful records of their children's language development (Lewis, 1951; Leopold, 1949; Stern, 1930). More recently, Nelson's (1973) study of early vocabulary asked a group of mothers without special training to keep records of their children's first 50 words. The advantage of parental reports is that parents have a greater opportunity to observe their children than do outside observers. In the early stages of speech development, words occur infrequently; during a two or three hour visit by a researcher the child may only produce a fraction of his total vocabulary. Further, early pronunciation is often inarticulate; many words are intelligible only to parents. The disadvantages of a parental recording system lie in the lack of reliability between observers. Parents vary in their definition of words and in the accuracy of their records. Insofar as these irregularities index parental attitudes toward langauge and other behavior, they may interact with the linguistic variables under consideration and further complicate an interpretation of the results obtained.[1]

Studies of syntax have usually employed just the opposite approach. With a few exceptions (Braine, 1963; Weir, 1962), recent records of children's early sentences have been kept by outside observers, using taped and written records of children's speech (Bloom, 1970; Brown and Fraser, 1964; Miller & Ervin, 1964; and many others). As children begin to speak in sentences, their production of intelligible utterances increases. Tape recording becomes a necessity if a complete record is desired. Transcription of such recordings is a time consuming task requiring a trained observer. Most parents thus become ineligible for the task of record keeping.

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[1] Preliminary analyses revealed a correlation of .12 at 18 months between maternal reports and vocabulary counts obtained from a trained observer.

The methodology of parental reports is thus only applicable to vocabulary development. However, outside observers with tape recorders can be used for the study of both vocabulary and syntax. In the present study, maternal reports and taped records were used to sample children's vocabulary, whereas taped records were used to obtain measures of other aspects of language production.

In addition to problems of measurement and recording, there are problems of interpretation which hinge upon how the utterances of young children are best classified. Traditionally, children's vocabulary was classified according to parts of speech (McCarthy, 1954). Two objections can be raised to this practice. First, children's meanings are often at variance with those of the adult. If, for example, a child uses "daddy" to refer to all males rather than only to his father, it is a common rather than a proper noun. Further, words can be classified according to parts of speech only on the basis of the roles they play in sentences (Menyuk, 1969). If the child speaks only in single words, parts of speech have no meaning for him.

The alternative seems to be a semantic classification system. There are problems here as well. Meaning changes over time. The child can use "car" to refer to all moving vehicles today and only to cars tomorrow. More important, if speech is holophrastic, the intended meaning of an utterance changes from moment to moment. "Car" can connote the desire for a car now and someone's possession of a car five minutes later.

The present study found detailed semantic analysis extremely difficult and so adopted a compromise which is closer to parts of speech than to semantics. Children's single word utterances were classified into parts of speech (see Appendix D)

However, where the child's meaning was clearly different from that of an adult's, the child's meaning was used as a basis for classification. Further, certain classification categories were introduced to allow for words which children frequently used differently from adults. The objection that children who do not speak in sentences do not have nouns, verbs, etc., still holds true. However, the purpose of this classification system was not to invest the child with these categories, but to relate his early language to the syntactic period in which parts of speech acquire meaning.

The functions of language. In addition to promoting vocabulary, a goal of the language curriculum was to help children appreciate the multifold uses of speech. Our research (Starr, 1974) and that of Nelson (1973), indicate that as children begin to acquire words, they become aware of the possibilities of language as a communication system. Some children develop a language orientation toward describing objects. They learn nouns and adjectives. Others focus on social and expressive terms; their speech is devoted to expressing needs and desires. A similar orientation or general interest characterizes his first use of syntax (Starr, 1974). He continues to talk about things or to express his feelings toward others. In the present study, we examined the functional aspects of the language children used. The ability to use language descriptively is an essential communicative skill. In order to communicate ideas, the speaker must be able to accurately describe actions, objects, and the relations between objects or actions and objects. Between one and two and a half descriptive language is, of course, very primitive. The child usually only names an object or describes it; only at two and a half does he begin to relate two objects or an object and an action. However, we assumed that the ability to label objects and their attributes was the forerunner of true descriptive speech. Demand speech represents the other side of the coin from descriptive language. Descriptive language deals with the world objectively; demand speech communicates the speaker's wants and needs. The child needs to acquire demand speech, for adult language is used to obtain fulfillment from others as well as to describe the world. Again, demand speech between one and two and a half is primitive. The child generally combines one key demand word ("more" or "want") with the object or action desired. We assumed that the use of these standard phrases represented the early stage of demand speech.

Between 18 and 24 months, children begin to grasp the conversation function of language. Interjections are a feature of any adult conversation: greetings and exclamations occur regularly in informal settings. Yet interjections, when compared to descriptive or demand phrases are seen to have little content; they express emotions, not ideas. In contrast, the presence of questions and answers in the child's language signals that the child is trying to use language to converse with someone, not merely to express feelings, describe objects or obtain fulfillment of his desires. Language with questions and answers sounds like a dialogue rather than a monologue. Questions and answers appear relatively late in the course of language acquisition, becoming frequent only when the child acquires a rudimentary vocabulary and syntax (Stein, 1974).

Although the child should be able to exercise most of the functions of language with a relatively limited vocabulary or syntax, there is some evidence that structural and functional aspects of language are not totally independent. How aspects of children's language change with age and the developmental timetable for particular forms and functions was a matter of considerable interest in our analyses of the data.

Comprehension. There is now adequate evidence that linguistic comprehension precedes linguistic production (Fraser, Bellugi & Brown, 1963; Nelson, 1973; Smith, 1970; Starr, in press). When language acquisition is approached with a semantic model this statement seems almost a truism. In order to produce a construction which will accurately convey his meaning, the child must have comprehended the meanings conveyed in other similar constructions. For example, the child who can convey an agent-action-object relationship such as "John throws the ball," must have comprehended other similar sentences. Otherwise he might have combined John, throw, and ball in any other of a number of possible permutations.

The comprehension tests were designed to provide information on the relationship between comprehension and language production. The items on the Assessment 2 test described some of the relationships frequently communicated by children's early sentneces. For example, some items described an attributive relationship, "Give more ball" or "Give big car." Other items described a possessive relationship, "Give Mommy's purse," (for a further description of these relationships, see Brown, 1973). We wished to compare the ease with which these various relationships were understood at 18 months, and the frequency with which they appeared in the sentences of two-year-olds.

The assessment of children's language. The child's language production and comprehension were assessed in a variety of situations at each assessment. Assessments took place in the home and last 1 to 1-1/2 hours. Each session was preceded by a 5 to 10 minute chat with the mother, during which time the observer briefly described each task. The situations were presented in an order designed to maintain the child's interest throughout the assessment session (see Appendix D). Thus specific tests (Comprehension, the Palmer) were interspersed with periods during which the child could play with toys as he wished. Periods of adult interaction (mother-child play, observer-child play) were interspersed with opportunities for the child to play alone. In most cases it was possible to keep the child happily involved in the proceedings for the entire visit.

Several portions of each assessment were taped on a portable cassette recorder. The tapes were used to assess the level of children's language production. Children's language was taped while they played with an adult and while they played alone. Toy sets were varied during interaction periods so that the children's language production was sampled over a variety of interpersonal and material settings.

Since transsituational reliabilities were moderately high, scores were combined over situations to produce the final measures of children's language productions. The measures of language usage were converted to percents because of high variability in the total number of utterances. Two observers classified a random set of 30 transcripts; interobserver agreement ranged from .95 to .98 (see Appendix D for additional details). The final set of measures were a) proportion of words (no. words/no. utterances, b) no. utterances/minute. The number of utterances per minute is positively correlated with the level of children's language production (Nelson, 1973). Thus, to some extent, this measure, like the proportion of words, assessed linguistic ability. The number of utterances per minute was also assumed to measure the child's efforts to communicate in spite of limited linguistic ability. Children with a high number of utterances per minute try to talk although they experience considerable difficulty in making themselves understood. c) % descriptive speech (no. description/no. utterances, d) % demand speech (no. demand object plus action/no. utterances), 3) % questions (no. questions/no. utterances, f) % answers (no. answers/no. utterances, g) % interjections (no. interjections/no. utterances).

The measures of children's vocabulary were a) percentage of nominals (no. of nominals/no. of words). A majority of early vocabulary words are nominals, and a very high percentage of nominals in early speech seems to be characteristic of children who acquire a large and varied vocabulary by two and a half (Nelson, 1973; Starr, in press), b) percentage of modifiers (no. of actions/no. of words). Action words, like modifiers, account for aonly a small proportion of early vocabulary. However, action words must become more frequent if sentences are to become more complex; growth in the proportion of action words would appear to be required when the child begins to produce long sentences.

Comprehension was assessed at each assessment. Test items varied with the age of the children, but the same format was followed at each age level. The items were designed to be of moderate difficulty for the age of the children tested. Since pilot work indicated that children generally performed better when test items were presented by the mother, such a procedure was followed here. The observer gave the mother a set of flash cards, and asked her to read them, one at a time, to the child. If the child did not respond to the instruction on the card, the mother was allowed to repeat the item three times before proceeding to the next card. The child was given a standard set of toys containing all the objects mentioned in his mother's instructions. After a break of five minutes, the mother was given a second set of cards and the child another set of toys. The procedure was then repeated. Items, materials, and scoring procedures are described in Appendix D.

The Palmer Concept Familiarity Inventory (1973) for 2 year olds was administered at 24 and 30 months. The test is a vocabulary comprehension test which assesses the child's ability to understand words which are commonly used to describe the attributes of objects. Each item presents the child with a pair of similar objects which might differ, for example, in color (e.g., a black horse and a white horse). The examiner then asks the child to point to one of the pair. The Palmer items used at each assessment are listed in Appendix D.

Maternal Speech

Although the potentialities for language lie within the child, the language he acquires is determined by the culture in which he is born. A knowledge of the characteristics of that langauge is an aid to understanding the child's efforts to match it. Occasionally speech to the child has been assumed to be identical with speech between adults (Chomsky, 1957). However, recent evidence suggests that speech to children varies in both form and content from the way adults speak to one another (Bernstein, 1970; Hess & Shipman, 1965; Snow, 1972).

The child hears speech from both his parents, from other adults and from other children. In the present study, we regarded the mother as a major source of linguistic information for her child. Her speech and activity are the primary variables through which we sought to affect the child's language. Operating from a Piagetian framework, we saw the essential function of maternal speech as providing the child a source of information about language to which the child must accommodate his growing knowledge of language. The child's language changes radically in this age span. If the mother's speech is provoke accommodation, it must also change.

Yet little is known of the precise characteristics of maternal speech which serves this function. Some tentative propositions made in formulating the curriculum were translated into assessment measures. In the early stages of language acquisition, the function of maternal speech is to acquaint the child with both the referential and expressive functions of speech; the mother uses language to describe the world and to initiate or maintain social contacts. It is an aid to the child's early langauge development if the mother actively initiates language experiences--if she uses it to describe objects or people, to direct the child's activity, or to express feelings.

As the child starts to speak, the mother's emphasis should shift from expanding the child's hypotheses about the function of language to the development of language itself. Our research and that of others (Nelson, 1973; Pfuderer, 1969; Snow, 1972) suggests that the crucial characteristic of optimal maternal speech now becomes its responsiveness. At this stage the mother bases the content of her speech on the child's interests. She bases the complexity of her speech on the child's level of understanding. She is sensitive to his incorrect and tentative classification system. When he misclassifies objects she responds by gently correcting him. When he calls a truck a car, she says, "Yes, it's a kind of car, that kind is called a truck," rather than, for example, merely informing him, "No, that's not a car."

When the child starts to speak in sentences, the quality of maternal speech apparently changes again (Halliday, 1969). Now the mother engages her child in dialogues, asking him questions, responding to his speech and asking him new questions to elicit more speech. By her example she teaches the child how to engage in adult conversation. Our data (Starr, 1974) suggests that now responding to what the child says is particularly important. Presumably the mother's expression of interest encourages the child to initiate conversation himself.

Structural analyses. Little research exists on the structural aspects of maternal speech. It seems reasonable to assume, for example, that the frequency of parts of speech in maternal language might influence children's vocabulary. Nelson (1973) found that the extent to which mothers named objects affected their child's vocabulary. In addition, Bernstein (1970) suggested that variation in children's vocabulary of nouns, verbs, adjectives and adverbs was related to their mother's speech. One puzzling aspect of children's early language is the presence and absence of certain structural forms. This can be partially explained on grammatical grounds; questions and negations, for example, appear late and also require complex transformations. Alternatively, it may be explained, as alluded to earlier, on the basis of the frequency of these forms in maternal speech. In the assessment of maternal speech, we examined structural variables such as noun-verb diversity and the mother's tendency to use complete sentences.

Content. Maternal speech can also be analyzed according to its content. The largest portion of mother's speech to small children consists of directions for their behavior (Starr, 1974). The frequency of such directions may be related to language because it indexes the mother's general interest in her child's behavior, including his speech (Nelson, 1973). Directions were defined as any suggestion, however mild, that the child do something. Directions thus included grammatical imperatives and statements and questions that were actually directive in intent.

Like directive speech, speech which describes the child may be an index of the mother's general interest in her child. To the extent that mothers who are interested in their children talk and listen to them more than those who are not, speech describing the child may be beneficial for language development. Speech which describes the child's activities may be particularly beneficial to language; the referent should be easy for the child to ascertain. The second largest portion of maternal speech to the child describes things (Starr, 1974). Utterances which had an object as their real or implied subject were classified as Describing Things. "That's a ball," "The ball is red," and "Where's the red ball?" are all examples of this category. Directive and descriptive speech tends to be fairly informative. As the mother tells the child what to do, she is labelling objects and relations; as she describes people and things she is using adverbs and adjectives. Some maternal speech conveys relatively little information regarding the relation between language and events. Many mothers speak almost exclusively in interjections--"Wow!" "Oh, oh!" "Good!" "Atta-boy!" "Stop!"--the stereotypic language of verbal reinforcement. Although possibly an effective means of controlling the child's behavior and certainly an important language function, interjections provide a relatively skimpy communication model.

The assessment of maternal speech. At some point in each assessment, the mother was asked to show her child standard sets of toys. Mothers were aware that this portion of the visit was taped, but they were not told that their own speech was of interest. Maternal speech directed toward the child during this segment was transcribed by a trained typist, checked and then coded whenever possible by the research assistant who collected the data. Again, measures were combined over situations to produce the final measures of maternal speech. These measures were a) % directive speech, b) % describing things, c) % describing the child, d) % describing other people, e) % interjections, f) % questions, g) noun/verb diversity,

h) % complete sentences. In the factor analysis, complete sentences which were questions were separated from negative and simple active,affirmative, declarative sentences in order to distinguish the mothers' tendency to promote conversation from her tendency to use grammatically complete statements. A final measure, 1) maternal responsiveness, took into account the contingency between the child's utterance and the mother's response. When the child speaks little, a maternal language style which is highly contingent offers the child a relatively limited sample of speech. Once the child is producing language, mothers with a responsive style say more, and at that point, what they way is likely to be linked to the child's interests and activities. Additional details regarding coding, calculation of scores, and reliabilities can be found in Appendix D.

Children's Play: Style and Structure

Children's play, although widely heralded as the young child's dominant form of spontaneous activity, is perhaps the least well documented and studied behavior of those we are considering. Whether simply the spontaneous expression of children's competence (Piaget, 1962, 1966; Sutton-Smith, 1967, 1971), or a process which promotes cognitive growth (Bruner, 1972) has been debated but not resolved. Indeed, if we consider play as a complex behavioral system with multiple forms and functions, it is unlikely that the question of its role in children's development will be resolved at the level of the global label used to stake out the domain of the activity; just as children's language needs to be partitioned into useful analytical categories, so it is necessary to partition play into smaller units which permit systematic observation.

Style of play. The contrast between specific exploration and diversive exploration (Berlyne, 1960; Hutt, 1970; Nunnally & Lemond, 1972) typically provides the basis for measures of children's style of play.

Suppose a child's activities are divided into an action component and an object component. In specific exploration, the relation is that of many actions to one object--individual actions might be brief or sustained, but the child samples one object while selecting broadly from his repertoire of behavior: A child might pick up an object and then shake, bang, mouth, or throw it. In diversive exploration, the relation is of one action to many objects--the child samples broadly from the objects in an array but narrowly from his behavior repertoire: A child might pick up one object after another, thus holding the action component constant. It is evident that a child who contacts many objects and who does many things with each of them within a given period of time will show a relatively high rate of action-object change. In order to summarize different patterns of action-object relations, at least three variables seem necessary: (a) one which reflects the extent to which a child restricts his activity to a particular preferred object, (b) another which considers the diversity of objects contacted and (c) a third which considers the rate at which actions and/or objects change.

In situations which permit choices, it is possible to examine children's sustained directed involvement with individual objects (Kagan, 1971; Reppucci, 1970; McCall, 1974), as well as the diversity of their contacts (Goldberg & Lewis, 1969; Messer & Lewis, 1972). According to one point of view, a young child's tendency to engage in sustained directed activity (based on the time spent with particular objects) indexes a reflective style of problem solving (Pederson & Wender, 1968; Kagan, 1971; Reppucci, 1970).

According to other investigators, preference for a particular object and the tendency to contact a great many different objects reflects the child's level of information processing (Messer & Lewis, 1972). However, there is some reason to believe that some components of children's activity with objects index an emotional response to situational stress associated with the presence or approach of an unfamiliar person (Ainsworth & Bell, 1970; Maccoby & Feldman, 1972).

The relation between age and children's style of play is also unclear. If, for example, a high rate of action-object change is a sign of impulsivity, one might expect to find a decline with age; if, however, the measure reflects information processing skills, one might expect an increase with age. If the specific exploration of a preferred object is related to the breadth of a child's behavioral repertoire, one might expect to find an increase with age as new activity schemes become functional; if the child's tendency to sample objects broadly is linked to a process whereby children come to know about novel objects in the environment, one might expect to find a decline in diversive exploration as children's experience with objects expands. If style measures index children's emotional responses to unfamiliar persons and situations, one might expect an increase between 12 and 30 months on all measures as unfamiliar people and places have a less disruptive influence on play.

Structure of Play. Although the action side of play is of considerable theoretical interest (Berlyne, 1960; Millar, 1968; Hutt, 1970; Nunnally & Lemond, 1972), measures of curiosity, exploratory or manipulative behavior are often based on the object side--the duration, latency, or frequency of object contacts. Distinctions among actions are most likely to be made in studies which present the child with one object at a time. For example, Switzky et al. (1974) differentiated exploration (the examination of an object visually and tactually) from play (rhythmic manipulation of the object or use of it symbolically to represent something else). In a recent study of free play, McCall (1974) defined finer qualitative categories (e.g., mouthing, appropriate behavior, secondary and tertiary circular responses), which showed significant changes between 8 and 12 months of age. Yet to many developmental theorists (Piaget, 1962; Werner & Kaplan, 1964) the form or structure of the activity is the most consequential aspect of the way children's object transactions change with age. Indeed, a recent observational study by Inhelder, Lezine, Sinclair & Stambak (1972) posited that during the second year of life changes in the way children manipulate objects should parallel changes in their tendency to use objects symbolically. Suppose activities are classified according to their structural characteristics. In a Piagetian taxonomy, one-object activities would be the most primitive. The child manipulates one object at a time as if it were an undifferentiated whole, using sensory-motor behaviors such as pushing, pulling, throwing, waving. At a somewhat more advanced level, children manipulate the parts of objects (wheels, knobs) and place two objects in relation to one another (i.e., on top of, into, next to) often governed by an apparent recognition of how objects typically go together (cup on top of table, spoon into cup). Presumably, such activities reflect the child's differentiation and organization of spatial relations--both the relation of a distinctive part to the whole and the relation of one object to another. Finally, the child comes to acknowledge other characteristics of objects (e.g., roundness) and to use these characteristics in his organization of them. It is at this level that he is able to solve form board problems or put rings on a stacking pole. It is also at this time that the child begins to build towers and rows in which objects are systematically ordered with respect to physical, spatial, or temporal schemes. It should be noted that age norms for items on infant developmental tests (cf. Bayley, 1969) seem to follow a similar sequence. From a developmental perspective, the striking phenomenon is that prior to a certain time, the task of putting a round form into a round hole simply doesn't make sense to the child. The progression suggested by these observations is as follows: The child initially performs action routines on an object treated as if it were a distinctive, undifferentiated pattern, unrelated at any given time to other objects in an array. Then, as individual object patterns become decomposed and dimensionalized, new patterns of "objects-in-relation" can be constructed by way of special combining activities which can be applied iteratively (e.g., one block on top of another). The appearance of pretend play at about this time seems to be associated with a new way of organizing relations between objects. If, as

Piagetians claim, activity-object representations are initially acquired through imitation (i.e., the figurative aspects of intelligence), the development of pretend substitutions would seem to depend upon the functioning of a second, more sophisticated process (i.e., the operative aspects of intelligence) which can break down, code and combine the central elements of activity-object representations Thus on theoretical and empirical grounds, there is some reason to believe that how children use objects changes with age, and that how they use objects in play expresses the practical, adaptive side of cognitive development.

Two quite different aspects of play--its style and its structure--seem to have different implications for children's social and intellectual development. With respect to style of play, interpretations disagree considerably, and how variables associated with children's style of play change with age is uncertain. The developmental implications of the structural aspect of play seem clearer. Changes in the way children use objects between 12 and 30 months--most especially, the way they impose upon objects relatively sophisticated modes of organization--presumably reflects the child's acquisition of mental structures which have to do with objects-in-relation to other objects. The case for individual differences is less clear, although one would expect more sophisticated ways of dealing with objects to be related to indices of intellectual competence.

The play curriculum evolved out of the notion that play was a childhood activity which, when unencumbered by stress and supported by an interest in objects, enriches children's experiences with the features and workings of physical things. We expected children in the play curriculum to be more varied in their activities and more sustained in their interests. We also expected play children to show relatively more mature forms of activity--more symbolic play, and more sophisticated object combinations.

Assessment Procedures. In order to examine style and structure within a single observational system, it was necessary to devise a procedure which took into account both action and object. The scheme eventually developed was based on a list of approximately 50 core verbs which described specific actions (puts into, fits, lines up, bangs, fingers, feeds, stirs, and so forth). A verb could only be coded when a child's contact with an object was visually directed (except for mouths) and although non-tactual contacts were coded (such as kicks), they occurred infrequently. A verb code was always followed by the name of the object contacted, so that the basic unit of observation was an action-object event. An observer, stationed behind a one-way viewing window in a room separated from the playroom, orally recorded on tape the child's ongoing action-object behavior blocked into 10-second intervals by a timer attached to the microphone.

Each verb was assigned on an *a priori* basis to a broader structural category--a verb such as fingers designated a non-specific exploratory behavior (M_1), verbs such as bangs or shakes referred to a well-defined sensory-motor action (M_2), a verb such as puts into designated a simple spatial relation (M_4), verbs such as feeds or stirs designated a pretend activity (P). The verbs and structural categories, and coding rules are given in Appendix CII; Table C_1 and Appendix CIII). The transcribed protocol from which scores were tabulated contained a structural activity code for whenever an action or object changed within a 10-second time interval and a list of the objects used by the child. Observer training and post-training reliability procedures are described in Appendix CII. Observer reliabilities taken over assessments were based upon 30 play episodes in which two observers were stationed in separated observation rooms. By pairing each of the five observers with every other observer, the sample of 30 represented three sets of 10 complete pairs. Another set of reliabilities, obtained only for selected key measures, were based on a larger sample of 100 children. Estimates of observer agreement for the sample of 30 were based on the ratio of the smaller score to the larger score, averaged over observer pairs, whereas correlation coefficients were obtained for the larger sample.

The following measures of style and structure were derived from the basic coding scheme. Observer reliabilities are given in parentheses.

1. Play Style: (a) Tempo of play, based on the number of action-object units per 10 sec. interval, reflects the rate at which the child changes either the object he is using or what he is doing with it. High scores reflect two sources of diversity--one from actions and one from things. Low scores could mean either that the child's activity was punctuated by pauses, or that it was highly repetitive (% observer agreement (30) = 96%; $r = .94$). (b) Focal Object Involvement (FOI) indexes the degree to which the child's interests tend to converge on one or two preferred objects. Each child has two FOI scores: FOI (1) is based on the number of intervals in which the child contacted his most preferred object (observer agreement (30) = 94%) and FOI (2) is based on the child's second most frequently contacted object (observer agreement (30) = 95%). In the final analysis, FOI (2) was subtracted from FOI (1) to obtain a measure of the narrowness of the child's preference. (c) Object Diversity reflects the breadth of a child's exploratory activity. The score is calculated as the number of different objects a child contacted during an observation period (observer agreement (30) = 92%; $r = .93$). (d) % Executive Failure was a measure designed to assess how well a child was able to carry out an intended activity (observer agreement (30) = 81%). According to Bruner (1968), skilled action, both in its sensory-motor and its cognitive aspects, should increase during the second and third year of life. An executive failure was coded for sensory-motor failures (cup tips as the child is trying to put a spoon in) or cognitive failures (trying to put a spoon into the blind end of a jar). Four additional measures, positive affect (92%), negative affect (95%), looks mother (87%) and looks experimenter (85%) assess the social-emotional aspects of play.

2.Play Structure: In the analysis of age effects for structural variables both frequency scores and proportions were used. Proportions were based on the frequency of a given form of activity divided by the total number of activities. (a) Level 1 activities are those which involved actions with a single object. One-object activities were considered to be the least mature form of play, which should show a decrease during the first year of life (% observer agreement (30) = 86%). (b) Level 2 included activities which indicate that the child either differentiated part of an object from the whole (such as turning the wheel of a truck) or placed one object in relation to another (spoon on cup, pot in truck) (% observer agreement (30) = 87%). (c) Level 3 consisted of activities which involved some constraint due to either the properties of an object (fitting spoon through the bars of the crib) or due to an ordering scheme imposed by the child (lining up two cups, making a row of chairs). Level 2 and Level 3 activities were expected to increase between 12 and 30 months (% observer agreement (30) = 82%; $\underline{r}_{100}$ = .89). Since Level 3 activities occurred relatively infrequently, Level 2 and Level 3 activities were combined in later analyses. (d) Pretend activities were analyzed separately on the assumption that pretend play reflected changes in the child's ability to represent familiar activities and events (% observer agreement (30) = 82%; $\underline{r}_{100}$ = .89). Briefly, a pretend activity was defined as one which resembled a practical everyday event displaced from its practical context (such as the motions of eating from a spoon in the absence of food, the motion of reclining with closed eyes without going to sleep). In more elaborate pretend activities, the child might treat an inanimate object as if it were animate (feeding a doll, putting a stuffed animal to sleep, or engage in typically adult activities (reading a book, telephoning). In coding structural activities, a superordinate code (M1, P) could be used when no verb from the 50 verb list was applicable. Additional details regarding the coding system, inter-observer and transsituational reliabilities and behavioral criteria can be found in Appendices CII and CIII (see also Tables C1, C2, C3).

The children were observed during two 10-minute episodes. A different toy set (consisting of 14 toys) was presented at the beginning of each episode (see Appendix C1 for toy lists). Toy Set I contained materials which tend to support pretend play (a truck-like truck, a doll-like doll, cup-like cups, and so forth). The materials in Toy Set II were roughly matched to those in Toy Set I with respect to general size and shape. Scores were moderately correlated across toy sets (ranging from $\underline{r}$ = .37 to $\underline{r}$ = .48; see Appendix CII, Table C3, for transsituational reliability coefficients). In order to simplify the analysis, scores were averaged across toy sets. In both play episodes, the experimenter suggested five pretend play themes to the child (e.g., "The baby is hungry, feed the baby"), at approximately one- to two-minute intervals. Procedural details are described in Appendix CI.

Maternal Play Style

The curriculum encouraged an elaborative style of adult participation in the child's play. The emphasis was not on the total amount of an adult's activity, nor did the curriculum encourage a didactic mode of maternal interaction. As defined in the curriculum, elaboration is an interactive concept based on the adult's response to the child's activity. If the child is banging on a drum, the mother might propose that he try banging on something else, thereby encouraging the child to extend familiar schemas to new things. The mother might also propose an elaboration on the action side by suggesting that the child try rolling the drum, thereby expanding the range of schemas applied to an object. Since young children often lack the fine motor skills necessary to carry through activities, the mother's role in helping the child (by steadying the drum, or retrieving it when it is out of reach) was also stressed. A helping activity was one in which the mother proposes no change in the child's activity. The definition of particular play entries were based on whether the mother proposed a change in the child's action, or object, or both. Figure 2 indicates how elaborative and unrelated entries were conceptualized. The curriculum attempted to enhance the diversity of children's play, by encouraging the mother to notice the fine details of the child's activity and to respond within the framework of the child's interest. How might a mother's play style change as the child grows older? One might argue that an elaborative style is "natural," and that, by its very nature, it would be linked to the child's behavior and therefore tend to keep pace with the child. On the other hand, mothers might tend to perform spectacles for children when they are young--to entertain and amuse them until the children themselves develop the skills needed to perform varied object activities. Finally, one might argue that mothers become more ambitious for their children as they grow older, and that with age they become more prone to tutor their child in the appropriate use of objects.

Figure 1 about here

Assessment Procedures. The assessment of maternal play style was based on the scheme described earlier. At each assessment, mother and child played together for periods lasting from 4 to 8 minutes. The toy sets contained a large number of attractive commercial toys. A mother's activity was coded whenever the mother handled an object with some gesture indicating an attempt to attract the child's interest (several mothers tended to play with the toys themselves, often with their backs to the child). Maternal behaviors were continuously coded on a pre-established form. Reliabilities were based on the record of two observers (one stationed inside the playroom and the other stationed behind a one-way viewing window) obtained for 75 children at 12 months and 100 children at 18 months. A detailed description of procedures and materials is given in the Appendix (CI, CII, Tables C4, C5).

The mother's play entries were scored according to the following categories: (a) *Elaborative* entries referred to those in which either the mother's choice of object, or her choice of activity matched the child's activity. (b) *Unrelated* entries were those in which the mother varied both activity and object. (c) *Helping* entries were those in which the mother's suggestion involved neither a change in activity or object (e.g., when the mother steadied a toy, or handed the child another block, or part of a toy to maintain this ongoing activity. (d) *Imitative* and *reciprocal* activities were those in which the mother either repeated what the child had done (without changing object or activity) or in which the mother repeated an interactive activity (e.g., child rolls peg to mother, mother rolls peg back to child). For a more extensive discussion of behavioral criteria see Appendix CIII.

Elaborative and helping activities were difficult to distinguish, and imitative-reciprocal activities occurred infrequently. In the final analysis, the index of an elaborative play style was the ratio of difference between elaborative-helping entries and unrelated entries and unrelated entries to the sum of all activities coded (observer agreement (30) = 91%; $\underline{r}_{76} = .85$). In addition, the total number of maternal play entries (observer agreement (30) = 89%; $\underline{r}_{76} = .82$) was analyzed.

Social Development

Undoubtedly the most intense feelings of childhood involve the social ties between a child and significant others in his environment. How the infant comes to form and extend social relationships, how he constructs a theory of his social world based on interactions with the significant people in his life, has received attention in the past from investigators of different theoretical persuasions and research propensities. Researchers studying maternal deprivation, infant attachment, and children's social play have provided descriptions of various social phenomena which appear during childhood. Ethologists, psychoanalysts, social learning theorists, and cognitive-developmental theorists have offered explanations for the appearance of these phenomena. More recently, the child's social world has been emphasized by those interested in early education. Realizing the pervasive influence of the social environment on the child's development, educators have expressed concern about the interactions between caregiver and child in day care centers and homes (Fein & Clarke-Stewart, 1972; Andrews, Bache, Blumenthal & Wiener, 1975; Lasater, Briggs, Malone, Giliam, & Weisberg, 1975; Leler, Johnson, Kahn, Hines,& Torres, 1975).

According to several recent studies (Clarke-Stewart, 1973; Watts, 1975), the child's relation with a primary caregiver in infancy appears to be of considerable importance to the child's social and, perhaps, intellectual development during the post infancy period. Research suggests that the mother-child relation may be the most important single social tie for children under three, at least for those living at home with the mother as primary caretaker. It is also likely that this relationship critically affects the child's relations with people other than the mother, and is therefore an important factor in the child's continued social development beyond the initial tie. This suggestion, as well as being a basic tenet of psychoanalysis, is supported by evidence from a recent observation study of children's social development (Clarke-Stewart, 1973).

The child's social behavior. In the literature on early social development, a focal concept is the child's "attachment" to his mother. Ethologists (Bowlby, 1969) conceptualize this phenomenon as an expression of the infant's innate biological impulses to cling and to follow; learning theorists (Cairns, 1967) consider it an outcome of conditioning which pairs the presence of mother with satisfaction of a primary need; but the most popular current stance is that the child's attachment to his mother derives from an interaction between his innately predisposed behavior patterns and environmental conditions, namely behaviors of the mother (cf. Ainsworth & Bell, 1970; Schaffer & Emerson, 1964; Maccoby & Masters, 1970). The concept of attachment, in it narrow connotation of an integrated behavior pattern which is apparent only upon separation from or reunion with the mother, or when stress is imposed, is but one aspect of the child's social development, however. The frequency and content of the child's initiative and responsive social behaviors to the mother and to others are more direct measures of how a child evokes and maintains social encounters. Recent research indicates that a child's social behaviors toward the mother--such as looking, smiling, or vocalizing to her--may influence the mother's sociability toward the child (Clarke-Stewart, 1973).

The second area which has received considerable attention in the literature on social development has been the child's reaction to strangers (cf. Schaffer & Emerson, 1964; Rheingold, 1956; Morgan & Ricciuti, 1969; Fleener & Cairns, 1969; Maccoby & Feldman, 1972). The variables examined in these studies are often "stranger anxiety" or "wariness." Measurement of these variables has often been confounded by potentially stressful circumstances, like the absence of the mother or the unfamiliarity of the setting. These studies have often emphasized negative reactions to the stranger (Cohen, 1974) and neglected positive behaviors. However, recent research indicates that children's reactions to unfamiliar persons are frequently positive during the second year of life (Clarke-Stewart, 1975), depending on circumstance or previous experience (Ricciuti, 1974; Fein & Apfel, 1975).

The measures of the child's social development used in the present study consisted of social behaviors toward the mother and toward strangers. The child's relationship with his mother was evaluated by observations of the behaviors which occur as mother and child go about their normal, daily activities in the home. Mother and child were also observed in a semi-structured laboratory situation. Behavior units describing the child's reactions to the mother included the child's enjoyment of social contact with her, the frequency with which he initiates social interactions, and his positive and appropriate social responsiveness to her advances or suggestions. Also observed was his physical contact with her, the mode of contact he uses most frequently when interacting with her, and the frequency of his expression of positive and negative emotion. The child's reactions to unfamiliar persons were observed in the home and in a semi-structured laboratory situation. Although naturalistic observations in the home are often discussed as if no one but mother and child are present, there is, in fact, an observer. The observer may be a more or less familiar person, but she is always a pleasant person with whom mother and child have a friendly though brief exchange before the observational period begins. As far as the child is concerned, the observer may constitute an interesting social being with whom to establish friendly social contact. One might suspect that as children become increasingly sensitive to finer aspects of their immediate social environment, the observer would increasingly attract interest and that the interest might be greater for children exposed to regular home visits. In a sense, the observer and the mother are possible targets for social overtures. Thus in the home observations it is possible to examine the child's preference for interaction with the mother relative to his interaction with the observer, although the observer makes no attempt to initiate or maintain interactions. Variables describing positive social behaviors toward an unfamiliar person in the home were similar to those indicated above for the child's behavior toward the mother.

Maternal behavior. The child's social behavior is only half the story of children's social experiences. The other half is concerned with the characteristics of the child's social environment--most specifically, the social behaviors of his parents toward him. For an analysis of the child's social experiences, the literature on mother-child interaction is relevant. The following statements summarize results and conclusions of several studies: the number of people in the child's world and the frequency of his exposures to them do not seem significantly related to his social development (Clarke-Stewart, 1973; Gewirtz, 1965; Ainsworth, 1963; Schaffer & Emerson, 1964). Social development does appear to be related to the frequency with which the mother expresses positive emotion to the child (Clarke-Stewart, 1973; Stern et al., 1969; Yarrow, 1963), the amount of social interactive stimulation she provides (Clarke-Stewart, 1973; Schaffer & Emerson, 1964; Walters & Parke, 1965). Particular interactive behaviors which are important include touching (Casler, 1968), smiling (Gewirtz, 1965), talking (Clarke-Stewart, 1973 ; Goldberg & Lewis, 1969), and eye to eye contact (Moss & Robson, 1967; Clarke-Stewart, 1973). Of considerable importance is the consistency of the mother's contingent responsiveness to the child's expressive behaviors particularly his social behaviors (Ainsworth & Bell, 1970; Clarke-Stewart, 1973).

Apparently, "tuning in" and a point of contact between infant and caregiver are important dimensions. But in order for the child to develop effective social transactions he may need others in his environment who will not only respond to him, but who will respond in a way that is predictably related to his own behavior (Yarrow, 1961), creating in the child a generalized expectancy of positive response (Lewis & Goldberg, 1969) and creating for the child opportunities for new behavioral adaptations (Kessen, 1968).

In the present study, we observed those maternal behaviors shown by other research to be influential aspects of the child's social environment. We observed variables such as the mother's expressions of affection and her stimulation of the child by talking to him, playing with him, her tendency to praise, criticize or restrain the child's activity.

Mother-child interaction. The design of the social curriculum and the variables used to assess it were derived largely from a longitudinal study of children between 9 and 18 months of age (Clarke-Stewart, 1973). In the study, 36 mothers and children were repeatedly observed as they interacted more or less naturally at home. The findings suggest that the notion of interaction requires fairly explicit behavioral definitions.

First, the child's positive involvement with the mother were positively related to indices of his competence in other spheres of functioning, particularly language and cognitive development. Children who were most competent in all areas of development showed a pattern of development in which interest in the mother was balanced with independence. Although they spent over 80% of the time they were awake in the same room as the mother, they were physically close to her (within 4 feet) only about half of their time, and in actual physical contact only from 7% to 20% at 11 months and even less (4% to 14%) at 17 months. Children who were lowest on measures of overall competence, on the other hand, either never touched their mother or were in physical contact with her more than 30% of the time. Competent children demonstrated the highest proportions of smiling at mother, having eye-to-eye contact with her and playing with her. In fact, these mother-child pairs interacted more frequently in every mode except physical contact and routine caretaking.

Second, for competent children, the behaviors of mother and child when interacting were more likely to be contingent upon and responsive to the actions of the other person. Neither mother nor child was operating in isolation; their contact was reciprocally interactive. The development of an optimal mother-child relationship appeared to depend upon the pairs working out mutually satisfying and balanced interaction patterns.

Finally, when patterns of causal direction were examined, it was discovered that there were three kinds of early maternal behavior which were most closely related to the child's competence. They were social stimulation (looking, playing, and talking to the child), expression of affection (smiling, caressing, and speaking warmly and positively to the child), and responsiveness to the child's social behavior (responding immediately, contingently, positively, and appropriately to the child's expressions). However, in these families (which were comparable to those in the present sample) affectionate and playful maternal behaviors were relatively infrequent (accounting for only 4% of the observed time the child was awake). An additional finding was that the child's early social behavior was a potent elicitor of positive maternal attention at a later time. If the infant looked, smiled, and vocalized to the mother frequently at 11 months, his mother stayed in the same room more, was more responsive to his distress and demands, and was more affectionate to him at 17 months.

Evidently, in different but significant ways, the behaviors of mother and child contribute to later outcomes. The "connectedness" between mother and child appears to be of central importance in the child's development of reciprocal control systems in which the child modifies the behavior of others by modifying his own behavior in response to others--the essence of social development.

For this reason, the observational procedure used to record the social behaviors of mother and child was based on a scheme which took into account the quality, timing and direction of an interaction. It was thus possible to consider the contingencies between observed maternal and child behaviors and operationally define variables such as maternal responsiveness and effectiveness. The scheme also made it possible to examine interactive episodes in which the behavior of mother and child are so temporally interlocked (mother gives, child takes; eye to eye contact) that the interaction is best described as mutual.

Social Assessments. The most important source of information about the social behaviors of mothers and children was the observation of interactions in the home as mother and child went about their normal daily activities. A minimum of one hour of such observation was recorded at each test point. Natural observations were recorded according to a continuous, second-to-second scheme. In essence, the observer noted in a two-columned stenographer's notebook the behaviors of the child and the people with whome he interacts, choosing from a fixed repertoire of behavioral units (e.g., looks, vocalizes, goes, expressive physical) which can be given specificity by particular qualifiers (at mother, to sibling, angry). Emphasis in the observation schedule is on interaction. One column of the notebook is reserved for the child's behavior; other people's behaviors which impinge upon the child are written in the other column. Behaviors can be simultaneous or sequential; this is indicated by the notebook lines on which they are recorded. The details of this observation method are described elsewhere (see Clarke-Stewart, 1973 and Appendix E, this report).

Home observation visits proceded in the following manner. The observer arrived at the home at a time prearranged with the mother to maximize the likelihood that the baby would be awake. After she arrived, the observer first talked with the mother briefly, inquiring about the child's health and schedule for that day, and requesting the mother to continue her normal duties and ignore the observer, who would be watching and following the child. Then, for the next 1 - 2 hours she recorded the naturally occurring activities of the infant and, when the mother was in the same room as the infant, of mother and infant. In the right-hand column of the notebook, short abbreviations for the infant behaviors were written; in the left column, maternal behaviors which impinged on the child were recorded. The behaviors which had been established and defined in the Clarke-Stewart study, and to a small group of qualifiers (e.g., "responsive") and specific object, person, and place names. The complete list of behavior units coded are given in Appendix E.

Behaviors of mother and baby which occurred simultaneously were written on the same horizontal line in the notebook; sequential behaviors were written on alternate lines. Every 10 seconds, at the sound of a timer in an inconspicuous earphone, the observer made a horizontal mark on the notebook line. Any single behavior was written only once in a 10-second period unless it was interrupted by another behavior and then resumed. A continuous behavior was indicated by a vertical line for as many time periods as it continued. At the end of each visit the observer made ratings based on that observation period. These included the infant's activity level, the mother's emotional expression and tone of voice, the amount, closeness, and vigor of her physical contact with the child, the mother's verbal and social stimulation, stimulation of the child with materials, responsiveness to the child's distress, and responsiveness to social behaviors. (Rating scales can be found in Appendix E . See Appendix E for a summary of the measures, the way they were constructed and inter-observer reliabilities.)

The measures used to assess children's social behavior were a) sociability to the observer, b) talks to mother, c) shows affection to mother, d) responsiveness to maternal sociability, e) social preference for mother (affection plus talks to mother minus sociability to observer).

Measures of maternal sociability were a) positive emotion, b) social stimulation, c) effectiveness (sum of social, verbal and material effectiveness), d) unaccepting, e) maternal responsiveness to child's social behaviors, f) maternal responsiveness per child's level of sociability.

Measures of the mutuality of the interactions between mother and child were a) mutual social object exchanges, b) mutual physical and eye-to-eye contact, c) mutual social contact, and d) same room time.

To complement the home observations, the child was observed in a standardized laboratory situation. During the first 5 minutes of the laboratory visit (episode 1) mother and child were alone; on assessments 2 and 4, an unfamiliar observer entered at the end of 5 minutes (episode 2), chatted briefly with the mother, and then occupied herself with paper work for 5 minutes. (See Appendix D, "Waiting Room" for a description of procedures and materials).

Four measures were derived from the observations. These were (a) mother-child distance, (b) child's toy contacts, (c) child's expressive behavior (smiles plus vocalizes), and (d) mother's involvement (contacts objects plus vocalizes). The construction of these measures and inter-observer reliabilities can be found in Appendix C.

Additional Variables

Formal testing. During their laboratory visit, the children were given the Bayley Scales of Mental Development at 12, 18, and 24 months and the Stanford-Binet Intelligence Scales at 30 months (Bayley, 1969; Terman & Merrill, 1973). Formal testing began after a 10 to 12 minute play episode, approximately 25 to 30 minutes after the child entered the playroom. Over the year and a half period, 7 examiners were randomly assigned to children. One result of this scheme was that relatively few children were tested by the same examiner on two consecutive assessments (11%), and no child was tested more than twice by the same examiner. The average inter-observer agreement on test items (# agree/ # agree plus # disagree) calculated for 50 protocols was 99% (See Appendix CI).

Family background information. The present study had several purposes. In addition to the development and assessment of the effectiveness of an educational program, we wished to examine the relation between the social milieu of the family, the educational and occupational status of the family and children's development. Family background information was obtained from the mother on the first assessment visit. We inquired about the parents' source of information about child rearing, family interrelationships, parents' education and occupation (see Appendix AII). In addition, the mothers were given the Peabody Picture Vocabulary Test (Dunn, 1965) at either Assessment 1 or 2, and the performance scale of the Wechsler Adult Intelligence Scale (Wechsler, 1955) at Assessment 4.

Data Reduction

As we indicated in discussions of the variables used to assess children's language, play and social development, a large number of behavioral units were coded and subsequently combined into larger categories. Several rules guided the initial data consolidation. First, units which occurred infrequently or whose distributions were skewed were either combined with other conceptually related units to form broader categories (guided largely by previous research), or were dropped from the analyses. Second, categories which were artifactually correlated (e.g., the child's distance from the mother and his physical contact with her) were also combined. Third, when the same behavioral categories were observed in more than one situation at each assessment, and when the overall transsituational stability was better than .25, categories were combined over situations. Finally, factor analysis was used to generate complex variables which represented patterns of maternal and child behavior across areas of development. As a result of preliminary analyses, several measures which did not contribute to the factor structure were eliminated, so that the factors used in subsequent analyses were based on 34 measures of child behavior and 20 measures of maternal behavior. Factor analyses with one VARIMAX rotation performed separately on maternal and child variables resulted in six child factors and 8 maternal factors which accounted for approximately 75% and 68% of the variance, respectively.

Data Analyses

Data analyses proceeded in several stages. In order to establish linkages to the previous research and to answer questions regarding particular aspects of children's development, such as changes with age and differences between boys and girls, univariate analyses were performed on individual variables. A second set of analyses were then performed on factor scores in order to examine these questions with respect to broader patterns of behavior. In order to avoid problems in the use of repeated measures designs (McCall & Appelbaum, 1973), scores were converted into trends (linear, quadratic, cubic) and multivariate analyses of variance were performed on trends scores to yield multivariate F-ratios for the main effect of age and for those interactions which involved age. Tests of orthogonal contrasts which compared treatment groups were superimposed upon this scheme in order to examine hypotheses which originally governed the research design. Although the assignment of subjects to treatment and control groups used randomizing procedures, group differences on pretest measures were examined by Sex x Curriculum analyses of variance. None of the differences were significant. Since three cohorts of children were recruited for the study, and since each cohort was nested within each cell of the design, preliminary analyses were performed to examine whether cohort differences contributed significantly to main effects or interactions. Since cohort differences did not do so, this dimension was collapsed in subsequent analyses.

The above analyses were undertaken to examine how mothers and children changed over the year and a half period and how components of educational program influenced change. However, change is but one aspect of development and not necessarily synonomous with it. In all likelihood, a capacity for change is balanced by a capacity for stability. If some aspects of development are relatively malleable and responsive to educational efforts, there are likely to be others which are relatively slow to respond to environmental changes. Moreover, it is possible that some influences on later development were in full force at 12 months when our program began and that some early relations are powerful enough to mark out features of later development even though important changes have occurred along the way. To investigate the effects over time of variables which did not respond to the intervention program, we used correlational analyses and a set of statistical procedures which permit inferences of a causal influence from the difference between temporally cross-lagged correlations (Campbell & Stanley, 1967; Eron, Huisman, Lefkowitz & Walder, 1972; Clarke-Stewart, 1973).

Finally, investigators of widely different interests have noted that the child's family background may be associated with the effectiveness of different early child programs (Dilorenzo, Salter, & Brady, 1969; Jensen, 1969; Fowler, 1970; Bereiter, 1970) and, perhaps, to the effectiveness of later schooling (Jencks et al., 1972). Although the hypothesis is intuitively reasonable, little is known about the relation between family life style and the utilization of educational resources (Scheinfeld, Bowles, Tuck & Gold, 1970). Demographic information and maternal IQ scores were factor analyzed to produce a reduced set of family structure variables which reflected socio-ecological aspects of the child's life. These variables were used in subsequent correlational analyses and in additional analyses of treatment effects.

CHAPTER III DEVELOPMENTAL TRENDS

The second and third years of life are marked by a series of milestones which one by one signal the end of infancy. Seemingly within a brief year and a half, children acquire much of the essential behavioral repertoire of adulthood. At 12 months they might understand a few words, but by 30 months language has become a comfortable mode of communication. At 12 months, they might manage a few wobbly steps; mouthing objects is still a popular way of exploring them, and the boundaries between the self and others are fluid and fleeting. By 30 months, the child is mobile, an ingenious creator of countless object maneuvers, and an artful autonomous participant in social encounters. But our sketch of change sweeps too wide an age range; it heralds the obvious, and treats change as if it were simply a matter of constant, inevitable increments. In fact, relatively little is known about important details of children's development between 12 and 30 months, about the pacing of changes in particular behaviors, about the spurts, decrements and plateaus which characterize the post-infancy period.

Moreover, dramatic changes in children's behavior easily obscure equally dramatic changes in the behavior of the adults who interact with them. Suppose it were possible to observe the behavior of parents through a screen which filtered out information about their adult status. Would behavior alone be sufficient to identify our subjects as adults? Would we witness changes in parent behavior as vivid as those we observe in their children? If our chart of children's behavior contains gaps, that of parents' behavior has yet to be drawn.

In the following section, we consider changes in the behavior of parents and children. Some changes, especially in the behavior of children, have been well documented by other investigators; others have not been studied in great detail.

Some issues are highly controversial. Whether boys and girls show different patterns of development and whether the mothers of boys and girls behave differently toward them are unresolved questions of considerable interest. In the presentation of the data, we first discuss the results of univariate analyses performed on a number of selected measures. In the discussion of the results of the multivariate analyses, we attempt to cast the question of change into a framework which considers connected patterns of behavior, derived from a large number of variables measured at four age levels.

Univariate Analyses: Age

Children's Language

Between one and two and a half years children begin to talk (Nelson, 1973; Brown, 1973; Leopold, 1948; Schlesinger, 1972; McNeill, 1970). At 12 months most children speak only a few words ("Mama," "cookie,") and respond only to familiar, simple commands ("Give me the ball."). By 30 months most children produce two and three word sentences ("More juice, Mommy.") and can comply with long , involved requests ("Put the ball and the car in your truck."). Accordingly, every linquistic variable measured in this study showed large age-correlated changes indicative of the rapid pace of language acquisition.

Language production. At 12 and 18 months virtually all speech utterances consist of a single word; there are few multi-word combinations. At this stage of language acquisition, the proportion of words depends upon the ratio of linguistic to non-linguistic utterances. It measures the extent to which the child has begun to use language; the child's use of language is highly correlated with the size of his vocabulary. At 24 and 30 months, multi-word combinations are common and non-speech vocalizations infrequent. At these ages the proportion of words depends largely upon the number of words per utterance.

The mean proportion of words at each age is given in Table 1. As predicted, there was a statistically significant increase in the proportion of words from 12 to 30 months. At 12 months very few utterances contained words. Even at 18 months only a third of all utterances were linguistic. By 24 months children's linguistic ability had improved tremendously; most utterances contained words and multiword combinations were not uncommon. Between 24 and 30 months the pace of acquisition declined; very gradually, the length of sentences increased.

The type of vocabulary used, as well as the proportion of words, changed between 18 and 30 months. At 18 months (no assessment was made at 12 months because of the small size of the corpus) the majority of children's words were names for people and things (68%). By 24 months 31% of all words were nominals; actions (25%) and modifiers (12%) now accounted for a substantial proportion of children's vocabulary. Between 24 and 30 months vocabulary underwent further changes. Pronouns and verbs increased (from 13 to 33% and 6 to 24%, respectively) while adjectives and stereotyped expressions declined (22% to 6%; 23% to 17%).

According to these results, much of the sample's initial vocabulary was limited to labels for objects and people. As reported elsewhere (Starr, 1975; Nelson, 1973; Greenfield, 1972) words which describe actions and locations are usually acquired later, just prior to the onset of sentences. After children learn to produce sentences, the type of vocabulary used is influenced by grammatical considerations. A large portion of initial sentences are noun phrases; although children do use verbs, their first sentences are likely to be combinations of nouns and words which modify nouns (Starr, 1975; Brown, 1973). The decline in proportional frequency of both nouns and adjectives and the rise in verbs between 24 and 30 months probably reflects the substitution of complete sentences for noun phrases.

Language function. The language curriculum was designed not only to influence the level of language production but also to affect the function which language performs. Two major linguistic functions were explored--1) Referential speech: descriptive speech which labels objects and describes the relation of parts to wholes. Referential speech is believed to be valuable for problem solving situations. 2) Conversational speech: speech used to obtain information and objects from others.

The proportion of both referential and conversational speech increased with age (Table 1). At 12 months most of the child's utterances were non-linguistic and served neither function. By 18 months, 36% of children's speech used words and 21% was either conversational or referential in nature. By 30 months 56% of all speech could be so classified; the remaining utterances included yes/no answers, interjections, and a small proportion of unclassifiable utterances (see Appendix D).

Referential and conversational speech were of almost equal importance. At the last sampling period the percentage of conversational speech was less than the percentage of referential speech. However, at 30 months a large percentage of the child's utterances were yes/no answers. Therefore, the two and one half year old was still engaging in conversation, but his conversation now consisted of responses to others as well as requests for information and objects.

It appears that referential and conversational speech are both acquired early in the course of language acquisition. However, the sample of referential and conversational speech was obtained while the child played with toys. Had other situations (lunch, bathtime) been sampled, the proportional relationship between these two speech functions might have been different.

Table 1 about here

Comprehension. An assessment of age related changes in comprehension is extremely difficult to perform. Small children's attention spans are notoriously short; any comprehension test must accordingly be very brief. A short test, however, cannot encompass all the items necessary to assess both the primitive comprehension of a 12 months old and the advanced understanding of a child of two and a half. For this reason different tests were given at 12, 18, and 24 months. The 24 month test was repeated at 30 months.

The 24 and 30 month comprehension test consisted of a series of twenty-one commands. Three of these commands were simple sentences. Nine more were matched to those three in length but used additional vocabulary. An additional nine were matched in length but contained embedded or dependent clauses. Children performed best on the simple sentences and equally on the vocabulary and syntac sections.

Children improved on both the vocabulary and syntax comprehension from 24 to 30 months (Table 1).

These comprehension results are supported by those obtained with the Palmer Concept Inventory given at 24 and 30 months. The Palmer requires children to distinguish between two concepts. For example, the experimenter shows the child a short and a long block and asks for the long one. Children's scores on the Palmer doubled between 24 and 30 months.

Maternal Speech

The language curriculum assumed that maternal speech is one of the most important determinants of children's language (Nelson, 1972; Snow, 1972). Efforts were made to influence maternal speech in the language curriculum, and a ten minute sample was obtained at each assessment. Five major variables were considered: 1) The percentage of descriptive speech: Highly descriptive speech was hypothesized to be more beneficial to early language acquisition than non-contentive speech, since descriptive speech provides the child with opportunities to acquire labels for things and activities in his immediate environment. 2) The percentage of directive speech was expected to decrease with age as maternal use of language becomes more diversified. 3) The percentage of complete sentences: The percentage of complete sentences provided a measure of the complexity of maternal speech. It was hypothesized that, for maximum linguistic development, maternal speech should be only slightly more complex than the child's level of comprehension. With the aid of contextual cues the child can decode such speech and, at the same time, learn new words or syntactical structures. Thus, for maximal linguistic development, the percentage of complete sentences should be low at 12 months and gradually increase with age. 4) The percentage of questions: The percentage of questions was a measure of the mother's efforts to communicate with her child. Concern with communication and value of the child as a communicator should be beneficial to language acquisition (Bernstein, 1970).

5) Maternal response to the child's speech was assumed to be especially important as the child begins to produce intelligible language. It is then that contingent maternal responses (in both speech and action) can introduce the child to the communicative functions of language, and, perhaps, by expanding or extending the child's utterances, introduce him to the finer details of linguistic relations (Cazden, 1968; Nelson, 1973).

All but the percentage of directive speech increased with age (Table 1). Age increases were expected for the percentage of complete sentences. The percentage of questions probably increased because, with age, children became increasingly able to respond. The increase in descriptive speech is more difficult to explain; descriptive speech was hypothesized to be most valuable at early stages of language when vocabulary acquisition was essential. Apparently, mothers felt that their child required more direction, and more repetition of directives, at 12 than at 30 months. Mothers may have also used more non-contentive interjections at 12 than at 30 months in order to limit the complexity of their language. The percentage of descriptive speech may therefore have increased with age because mothers felt less need to instruct their children and less need to simplify their speech as the child becomes older. Maternal response to the child's speech shows a steep drop at 24 months and a rapid recovery by 30 months, at which time mothers tend to respond either verbally or non-verbally to over 55% of their child's utterances. Whereas at 12 months, the mothers' responses were largely non-verbal, by 30 months their responses are predominantly verbal. The precipitous drop in the proportion of responses of both kinds accompanies the child's abruptly expanded speech repertoire, as if at that particular moment in time the child's speech outburts is semi-autotelic, neither enlisting nor requiring an active, responsive language partner. Note that the mothers' speech still contains a high proportion of directives, and that the decline in directive speech is accompanied by an increase in responsive speech, perhaps another sign that the language of mother and child has become more mutually conversational.

There is a close correspondence between age changes observed in maternal speech and child speech. As discussed above, the conversational function of children's speech was eventually exceeded by the referential function. The function of maternal speech changed from telling to asking and responding. The percentage of complete sentences showed the largest increase in the period between 18 and 24 months. Children's proportion of words showed its greatest spurt in the same period. Both the percentage of maternal questions and the percentage of children's questions are stable at 12 and 18 months and then begin to rise.

It is difficult to assign causality to these relationships. In the case of descriptive speech, for example, the child probably influenced the mother. Changes in the child's personality and linguistic proficiency may have produced the rise in maternal descriptive speech (see above). At the same time, the mother probably influenced the child. Assuming that the mother serves as a model for the child, as she becomes more descriptive in her speech the child should become more descriptive as well. Similarly, while the percentage of complete sentences was probably a response by the mother to the child's linguistic ability, the child's acquisition of vocabulary and syntax should have been affected by the complexity of maternal speech. Maternal and child speech can be conceived as a feedback loop in which changes in one continually produce changes in the other.

Children's Play

Style of play. At 12 months the child contacts and explores objects although his repertoire of behavior may be limited. Apparently, between 12 and 30 months, the pace of action-object change becomes neither faster nor slower, and contacts with objects in the environment becomes neither more nor less diverse. However, the child shows more sustained interest in a particular object, so that the impression of a casual observer is that play has become less diffuse and better focused. Mean scores at each age level are presented in Table 2. It is evident that both measures of focal object involvement (i.e., the extent to which interest converged on one or two objects) show significant increases with age. Scores at 18 months are a notable exception. In support of the frequent observation that the behavior of children of this age tends to be fragmented (Escalona, 1973; King & Seegmiller, 1973), tempo and involvement measures show a drop between 12 and 18 months and in increase between 18 and 24 months. It is of interest that changes in focal involvement occur in the child's most preferred and second most preferred playthings, a pattern possibly reflecting the tendency to use two objects in combination (e.g., a cup and a spoon).

Table 2 about here

Play structure. The mean scores (proportions and frequencies) for Level 1, Level 2, Level 3, and Pretend activities are shown in Table 3. Level 1 activities declined over the age range, and although 18-month scores showed the steepest proportional drop (18%), they were in keeping with the overall decline. As expected from a Piagetian perspective, Level 2 and Level 3 activities increased over the year and a half period, most markedly between 24 and 30 months. Not surprisingly, pretend activities show a consistent increase from one 6-month period to the next. The steepest proportional rise is between 12 and 18 months (10%), with more moderate increments thereafter (95% and 6%, respectively). It should be noted, however, that at each age level, one-object activities are the dominant type of manipulative behavior, although by 30 months, the total proportion of Level 2, Level 3 and Pretend (55%) exceeds the proportion of Level 1 activities.

Table 3 about here

Also noteworthy is that patterns of change between 12 and 30 months are strikingly similar to those reported by Sinclair (1970) and Inhelder et al. (1972). Although the abrupt increase in symbolic play during the first half of the second year (when it becomes established as a usable form) is accompanied by increases in relatively mature non-symbolic activities, it is not until the first half of the third year that behaviors in the latter group (especially Level 3) begin to come into their own. It is necessary to bear in mind, however, that the appearance of particular forms of play is undoubtedly influenced by the available materials, so that conclusions regarding phases in the development of structural forms must be tentative.

Maternal play styles. How mothers' tendency to use an elaborative play style changes with age is shown in Table 4. The measure was one in which unrelated entries were subtracted from helping-elaborative entries (divided by the total number of entries), so that a negative cell mean indicates that mothers tended to favor entries that were unrelated to what the children were doing. It is evident from the table that the mothers increasingly used an elaborative style as the children grew older. The largest increase occurs between 12 and 18 months (27%) whereas adjacent increases between subsequent ages declines.

Table 4 about here

The most striking change in the mothers' tendency to cue her activities to those of the child thus occurs when the child shows the most marked decline in immature object activities and increase in symbolic activities. Evidently, mothers do not maintain a constant linkage between the child's activity and their own: when the child's activity is relatively immature, mothers ignore it, but when the child adopts a more sophisticated mode of object behavior, mothers become more likely to adopt a style which takes the child's behavior into account. Also, as the children grew older the mothers tended to enter the child's play less often. The most precipitous decreases occurred between 12 and 18 months ($\overline{X} = .89$) and between 24 and 30 months ($\overline{X} = .87$). The drop between 24 and 30 months seems to accompany the increase in Level 2 and Level 3 activities shown by the children.

In sum, the diversity of children's exploratory behavior remains relatively stable between 12 and 30 months. The 12 month old is mobile and alert enough to investigate objects of interest in his environment, as if the capacity to take note of an array of objects is relatively well-established by 12 months. If the breadth of the child's contacts remains relatively stable, how he distributes his interest changes markedly. Over the year and a half period, the short bursts of interest characteristic of the 12 month old are replaced by relatively sustained periods of activity. Children seem to become more selective in their play; their preferences sharpen and they become more absorbed in activities with one or two preferred objects. An increasing tendency to become "hooked" on objects is accompanied and, perhaps, supported by an expanded behavioral repertoire, as if the child's interest in an object derives less from its external properties than from the activity a child can impose upon an object. Mothers seem to acknowledge the child's growing sophistication. They become less prone to enter the child's play--to suggest, demonstrate, or perform spectacles to amuse him. However, they are not necessarily uninterested in the child's activity; on the contrary, they appear to be alert to what the child is doing and increasingly likely to cue their entries to the child's immediate interests. When monitored over 6-month intervals, it becomes evident that the rate of change is not constant, that there are spurts as well as dips and plateaus. Moreover, not all changing behaviors have the same time table, and not all show increments with age. In play, as well as language, development during the year and a half period seems to be characterized by a set of holding gates which govern the sequencing of new behavioral components.

Social Development

Social interactions in the home. In the year and a half period from 12 to 30 months, there are striking changes in the child's language and play. Not surprisingly, there are commensurate changes in ongoing patterns of social interaction between mother and child. Once again, the changes do not appear as constant increments or decrements; rather, changes in social behaviors show precipitous increases or decreases at some ages and not at others. Mean scores for mother and child measures are presented in Table 5.

Table 5 about here

Consider for example the child's response to mother's social behaviors. Between 12 and 24 months there is little change, but between 24 and 30 months, the children show a substantial increment in their overt responsiveness to adult sociability. Although the mother's response to the child's social behaviors varied somewhat with curriculum group, the mothers tended to become less responsive to the children's social behaviors, as the children were becoming more responsive to the social behaviors of the mothers. The mothers' drop occurs somewhat earlier (at 24 months), which poses interesting questions regarding the system of reciprocity involved--to what extent might the mothers' declining responsiveness reflect discouragement in the face of stability in the child's behavior, and to what extent might the mothers' declining responsiveness precipitate an increase in the child's? Other aspects of the mothers' social behavior are also changing over the year and a half period. A substantial decrement between 18 and 24 months appears also in the extent to which mothers express positive emotion, and provide social stimulation. Although mothers' verbal stimulation is maintained between 12 and 24 months, it finally drops between 24 and 30 months.

Furthermore, mother and child are increasingly less likely to be in the same room over the year and a half period, with the largest decrement occurring between 18 and 24 months. Since scores on all measures take same room time into account, the picture which emerges suggests that mother and child tend to increase their spatial distance as they decrease their social encounters. Although the mothers also become less unaccepting and less critical of the child, the question is whether interpersonal detachment is the price of a possibly beneficial change.

Recall that the observational coding scheme described earlier made a distinction between mother-child interactions (in which one person initiates an encounter and another person responds to the encounter) and mutual mother-child transactions in which both mother and child seem to be mutually involved in an ongoing exchange which is difficult to divide into initiate-respond sequences (at least with the observational procedures used here). Suppose the child is curled up in the mother's lap and the child leans against the mother as she strokes his head. Suppose the two are playing a social game or suppose the two are sharing a household activity--regardless of who initiated the contact the shared activity proceeds with the mutual consent and reciprocal interest of the participants. As indicated in Table 5, mutual physical contact between mother and child declines between 18 and 24 months. However, mutual social activities increase during the same period. Although the mother's verbal stimulation increases slightly, the child's conversations with the mother increase at a fairly constant rate during the second year. Thus, it would seem as if less mature forms of social engagement are being replaced by more mature forms which involve a shift from short term interactive episodes to more sustained, flowing, mutual exchanges. Measures which failed to show significant age effects are also worth noting; for example, children did not change in their displays of affection, and mothers did not change in the effectiveness of their management procedures.

It is also apparent from Table 5 that the observer became increasingly a part of the home environment. The child's social overtures to the observer increased at each age level, most steeply between 18 and 24 months. The implications of this for home-based observational studies of mother-child interaction merits careful consideration. Although with the informed consent of the mother, the observer deliberately maintains the posture of a non-participant, the child apparently entertains a different view of things. To the child, the observer becomes a viable and attractive social presence as the child's social horizon expands. Again, the data pose exceedingly difficult questions regarding the extent to which other observed changes in the behavior of mother and child might be governed to some extent by the special characteristics of the observational situation in conjunction with developmental changes in the child's response to that situation. One might wonder, for example, about the extent to which the decrease in the time spent by mother and child in the same room might not be a function of the child's realization that he is not alone when the mother is absent and the mother's appreciation that a benign, responsible adult is in the room with the child.

Once again, it is evident that mothers as well as children show striking behavioral changes during the year and a half period. More important, perhaps, is the observation that not all seemingly "good" maternal behaviors increase; rather, mothers seem to revise, quite drastically in some cases, their way of behaving toward their children. Whether there are causal linkages cannot be inferred from age trends, but it is clear that mothers keep abreast of children's changing capacities: in language, mothers use fewer directive and more descriptive statements as the children grow older; in play, they become less intrusive but more elaborative; in their social behavior, they shift from social initiation to social mutuality, from close physical supervision to less direct supervision from a distance.

The children, too, changed. Regardless of curriculum group, all children learned to talk and understand. In the process of learning language, their vocabulary changed enormously and their use of language became flexible and varied. As children contacted the diverse objects of daily life, they acquired new skills for manipulating them and the basis for symbolic, socio-dramatic play. Concurrently, the social interests and techniques of the children expanded as they became more assertive participants in social exchanges. It is evident that any curriculum, any attempt to modify behavior, had to operate on a functioning system already in flux.

The overall direction of the changes discussed so far appeared in all curriculum groups regardless of sex. However, boys and girls did differ and on some variables the nature of the differences depended on the children's age.

Univariate Analyses: Sex

Language

Sex differences in early language development have been noted by several investigators (Moore, 1967; McCarthy & Kirk, 1963) but it is unclear whether differences reflect primarily the girls' greater fluency or whether they reflect differences as well in the kind of language spoken by boys and girls. It is evident from the mean scores displayed in Table 6 that by 18 months differences appear on measures of fluency rather than measures of style (e.g., expressive or referential). At 12 months, boys and girls do not differ significantly in the proportion of words spoken or understood. Significant differences appear at 18 months, and remain relatively stable thereafter. However, a significant interaction with age also appears on the Palmer CFI, even though the instrument was not used until the children were 24 months of age. Although both sexes show improvement with age, the small differences initially favoring the girls more than triple by 30 months.

Table 6 about here

The only maternal speech variable to show a relation with sex was the degree of noun-verb diversity in the mother's speech with her child--and here the initial difference which favored the boys was reversed between 18 and 24 months to favor the girls. Ordinarily, one might assume that a high degree of diversity in maternal language would support language acquisition. In this case, however, the more fluent girls have mothers who use less complex language. Too much diversity, especially when disconnected from the child's activity or the concepts he understands, might make the task of word acquisition more difficult. If so, the more complex language used by the mothers of boys may have been inappropriate for the children's level of development. Belatedly, by 18 months, the mothers begin to simplify their language to boys just as they increase the complexity of their language to girls.

Play

Boys and girls differ in the way they use objects (see Table 7). Boys show a preference for manipulating single objects and combining objects (Level 1 and Level 2). To complement the stereotype, girls are more likely than boys to use objects to mediate social exchanges. Girls are also more diverse in their exploratory behavior. They contact a wider array of different objects, possibly in the service of sharing new and interesting discoveries with the mother. Is there any evidence that boys play more "actively" than girls? The groups do not differ in the tempo of play, nor is one group more likely than the other to show sustained preferences for one or two objects (Brooks & Lewis, 1974). Sex differences were more likely to appear on structural rather than style variables. What children choose to do with objects seems to be more sex differentiating than the manner in which they do it (Bronson, 1971). It is surprising that boys and girls did not differ on the measure of pretend play. The averaging of scores across play sets eliminated the significant difference which appeared with realistic toys ($p < .001$). When the playthings consisted of doll-like dolls, truck-like trucks or cup-like cups, girls pretended more than boys ($\overline{X} = .21$ and $\overline{X} = .16$, respectively).

Of considerable interest is the failure to find interactions with age for any of the above differences; significant differences in Level 1 object activities, and in social object actions appeared when the children were 12 months old ($p < .019$ on both measures). However, a maternal measure showed significant changes with age. The extent to which the mothers entered the child's play differed for boys and girls, but the direction of the difference depended on the age of the child (see Table 8).

Table 7 about here

At 12 and 18 months, mothers were somewhat more likely to enter their child's play if the child was a girl. At 24 months the direction of the difference undergoes a marked shift--now the mother is more likely to make a play suggestion if the child is a boy. Although over the year and a half period mothers tend to become less intrusive when they play with their children, the mothers of girls show a relatively steeper decline than do the mothers of boys (who actually become somewhat more intrusive between 18 and 24 months).

Table 8 about here

Home observations. When children are observed in their own homes, girls are more prone than boys to initiate social exchanges with relatively unfamiliar persons. As indicated in Table 7, girls initiated more social overtures to the observer and talked more to the mother. If the children differ, so apparently do the mothers. In support of other findings (Minton, Kagan, & Levine, 1971), mothers tend to be more unaccepting, critical and constraining when their children are boys. Whether maternal differences are related to a greater incidence of "misbehavior" in the boys, or to their tendency to ignore maternal requests and demands as some investigators have suggested (Maccoby & Jacklin, 1974), cannot be determined from the present measures.

Formal testing. Sex differences on the Bayley Scales of Mental Development and the Stanford-Binet Intelligence Scale have been reported by other investigators (Wilson & Harpring, 1972; Goffeney, Henderson, & Butler, 1971; Lewis, Rausch, Goldberg & Dodd, 1968) for children between the ages of 8 months and 3 years. Reported differences invariably favor the girls. Results of the present study provide additional evidence that girls perform better than boys on tests of general ability. From Figure 2, it is evident that a small difference appears at 12 months. By 18 months, boys show a 5 point decline and girls show a 5 point increase, thereby producing the greatest difference between the groups (13 points, $p < .01$) found at any age level (see Appendix F, Table F1 for means and Table F2 for stability coefficients). From 24 to 30 months, differences are more modest, but still favor the girls ($p < .05$ at 24 months). The changing pattern of differences may reflect the tests' increasing emphasis on language items which would bias the test in favor of the girls. Another possibility is that girls are better test takers than boys. Girls' greater sociability may offer them a test advantage, especially between 18 and 24 months when the close-in work with an unfamiliar adult examiner might be enjoyable for girls and irritating for boys. Additional data pertaining to these possibilities is presented in a later section.

Figure 2 about here

An Unfamiliar Situation

To complement home observations, variables associated children's social behavior were assessed in the laboratory--first, when mother and child were alone and then in the presence of an unfamiliar adult who (after an initial greeting) busied herself with paperwork and interacted with neither mother nor child. It is evident from the mean scores presented in Tables 9 and 10 that differences between boys and girls depended to a considerable degree on the situational context. When mother and child were alone, their proximity to one another did not differ according to sex. However, in the presence of an unfamiliar person, girls tended to stay relatively closer to the mother (and the stranger) than did boys, although a distance reduction appeared in both groups. In general, the children were more likely to smile at the mother after the stranger's entry, but which sex smiled more depended on circumstances: more girls smiled when they were alone with their mothers and more boys smiled in the presence of a stranger.

Tables 9 and 10 about here

However, the extent to which boys and girls physically contacted their mothers in different situations depended on the children's age. When alone with their mothers, both boys and girls are less likely to be in physical contact with her, but at both ages, more girls than boys are likely to seek physical contact. The significant interaction between sex and age comes largely from Episode 2. At 18 months, 60% of the girls make a physical contact with the mother, whereas only 36% of the boys do so. By 30 months, differences are reversed- 53% of the boys physically contact the mother and 38% of the girls do so. Girls show a decline regardless of circumstances, whereas boys do not. Boys show a pattern of behavior sensitivity at 30 months which girls showed a year earlier.

For boys it is as if the presence of a stranger energizes contact and the expression of positive affect toward the mother. Perhaps boys and girls differ less in their general sensitivity to persons than in the behavioral media which reveals it and the circumstances which provoke its expression--girls move bodily closer whereas boys move closer with behaviors which mediate social contacts over a greater physical distance; differences are less likely to appear when children are alone with their mothers than when an unfamiliar person is present.

Although boys and girls show behavioral differences on several measures, the magnitude of the differences is hardly striking considering the number of children in the sample and the four ages at which children were observed. If differences are relatively subtle, it is not surprising that previous research findings would be inconsistent. But small differences are not necessarily trivial or inconsequential. The behaviors of boys and girls are measurably different in several respects, and behavioral measures are, at best, thin and partial indicators of variability, indicators which simplify complex behavioral events in order to reduce them to manageable domains. Whether boys and girls differ would seem to be a less interesting question than the fine details of how they differ.

Our results suggest that during the second and third years of life, boys and girls differ in how well they understand language and in the complexity of their speech. Although boys and girls also differ in their sociability and their style of play, they do not differ in their use of language for reference or communication. During the first half of the second year, mothers use more diverse language, and are less intruding when they play with boys. Mothers seem to be more socially engaged with their daughters, and perhaps as a consequence more sensitive to their level of language development. As we indicated earlier, there are grounds for believing that at 12 and 18 months, a less varied vocabulary with frequent repetitions geared to the child's ongoing behavior offers invaluable support to the child's acquisition of words and meaning. If so, the mothers of girls were providing a more supportive language learning environment than were the mothers of boys. But at 24 months, when the language differences between boys and girls is greatest, there is a striking shift in maternal behavior -- mothers begin to take a relatively more active role in their boys' play, and as they do so, their language becomes scaled to the relative abilities of their children.

How stable are the differences between boys and girls? All of the differences which appeared at 12 are evident at 30 months, although on the Binet they are no longer significant. As might be expected, differences in language ability do not appear until 18 months, but these, too, are present at 30 months. Maternal measures tend to be less stable and on two of the three maternal measures which revealed sex differences, the direction of the difference changes between 12 and 30 months.

Multivariate Analyses

The preceding discussion was based on a sample of individual measures selected to illustrate aspects of children's language, play and social development. However, since a total of 54 mother and child measures were available for each of the four assessments, a selection might present a biased portrait of changes over the year-and-a-half period. Further, inspection of the individual measures suggested that some measures formed sub-groups which shared a common pattern of change. In addition, correlational analyses indicated complex inter-relations among measures. In order to extract general patterns, the final step in data reduction used factor analysis. VARIMAX rotations performed separately on 34 child measures and 20 mother measures (see Appendix F, Table 3) yielded a reduced set of variables which represented the patterning of behavior over different assessment situations, ages, and aspects of competence. It should be noted that information about subject characteristics or curriculum differences was contained in the final set of factors in so far as the correlations between individual measures were influenced by these variables Each factor could be considered a complex behavioral variable tapping an underlying dimension of behavior derived in part from sources such as age, sex, birth order, parent education, parent IQ, independently, or in interaction with curriculum effects. Since the factors were extracted from a VARIMAX rotation performed on the total set of scores (136 for each child, and 80 for each mother over four assessments[1]), the factors were orthogonal with respect to the total set of scores, but not orthogonal within independent sources of variation. The important point is that additional analyses performed on factor scores could examine the contribution of such sources to the total variance, as well as the concurrent and cross-lagged correlations between mother and child factors at successive age levels.

Table 11 about here

Patterns of Behavior

Children. The six child factors listed in Table 11 accounted for approximately 75% of the variance. Two factors, Factors 1 and 6, seem to differentiate functional and tested competence. According to Factor 1, functional measures of language, play and sociability share common features over the 12- to 30-month period. Note that advanced language forms are associated positively with advanced play forms (e.g., pretend play) and negatively with immature play forms (Level 1 activities). In addition to being advanced in their symbolic structures, children who score high on this factor are also advanced in the use of language for communication and in their sociability toward unfamiliar persons. Interestingly enough, tested competence as reflected in the high weighting of the mental test scores on Factor 6 is also associated with social behaviors. Considering the nature of the relationship between the child and the examiner in the testing situation, it is not surprising to find that a particular form of social behavior -- the social exchange of objects -- or that the child's sociability toward an unfamiliar observer (measured in the home) should be represented in this factor. It is possible, then, that children's performance in standard testing situations between 12 and 30 months is closely linked to their social maturity.

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[1] Scores were randomly assigned to 12 month language measures (% Descriptions, % Demand, % Questions, % Answers, % Modily and % Action) and play measures (pretend play) which tend to be either infrequent or unreliable at that age. The random assignment was constrained by the range of the obtained cell means within each sex group. The factor analysis took age, sex and curriculum group into account.

The factor analysis revealed two patterns associated with stylistic aspects of play (Factor 2 and Factor 3). The play of children who score high on Factor 2 tends to be achievement and problem-solving oriented. Manipulative activities are biased toward a more advanced developmental level in spite of considerable failure. High scoring children show sustained and narrow object preferences; they demand little of adults although they respond to achievement-oriented questions (What is that?). A second style factor (Child Factor 2) reflects the dimension 6F specific-diversive exploration. High scoring children show a rapid tempo of activity change confined to a limited range of objects. A child who scores high on this factor is likely to become intensely preoccupied with a particular object which is manipulated in a variety of ways; a child who scores low is likely to engage in diffuse, aimless, exploration punctuated frequently by episodes of fretfulness.

Two distinctive social patterns also emerged from the analysis. Child Factor 4 reflected children's social interaction and preference for the mother in the home setting. In contrast, Child Factor 5 reflected the children's sociability toward the mother in the laboratory setting. Children who score high on Factor 5 tend to stay close to their mothers, their expressive and object behaviors are mother-directed and their manipulative play is relatively limited.

Stability coefficients varied considerably from factor to factor (see Table 4 Appendix F). The highest coefficients appeared for Test Competence between 18 and 30 months (range r = .32 to r = .50), whereas the most persistent stabilities appeared for Social Interaction-Proximity M in the laboratory situation (Factor 5). Functional social-symbolic competence was relatively stable between 18 and 24 months (r = .36), and somewhat less stable between 24 and 30 months (r = .28). Since many of the language functions represented on this factor are barely present at 12 months, the low correlations between 12 and 18 months (r = .09) and between 12 and 24 months (r = .07), are less surprising than the small but significant correlation between 12 and 30 months (r = .25).

Table 12 about here

Mothers. The factors extracted from measures of the mothers' social, play and language behaviors are listed in Table 12 . Maternal Sociability toward the Child (Factor 1) and Social Mutuality (Factor 3) seemed to reflect different patterns of maternal social behavior. Mothers who score high on Factor 1 are socially stimulating and responsive to their children. These mothers deal effectively with their children's demands and tend to spend a considerable amount of time in physical proximity to their children. Mothers who score high on Factor 3 tend to favor mutual interactions rather than those which are either initiative or responsive.

The remaining mother factors reflect different combinations of maternal directiveness and intrusiveness qualified by the style of the mothers' language interactions with the children. Mother Factor 7, for example, reflects general passivity accompanied by a responsive mode of verbal interaction. A mother who scores high on this factor would provide a poor language model for the pre-verbal child who produces relatively little speech, but such a mother might be a highly effective tutor for the older child who has mastered enough language to produce rudimentary forms on his own. Factor 4 reflects the combination of maternal language richness and non-intrusiveness. A high scoring mother is generally diffident and unimposing, but the language she produces when she interacts with her child is well-formed though not necessarily tied to her child's language.

Factors 2, 5 and 6 represent different patterns of maternal control. For example, mothers who score high on Factor 6 tend to be bossy and controlling--they dominate their children's activities while providing a relatively impoverished language model (e.g., "Put it there," "It goes in that one"). The language impoverishment of mothers who score high on Factor 5 comes from the use of language almost exclusively to deliver verbal reinforcements. These mothers participate actively in their children's play and when they do so, their speech is heavily punctuated by interjections such as "Atta boy!," "Wow!," "Good!,""That's it!". In general, those factors which load high on maternal play entries mark mothers who tend to be exceedingly busy when they play with their children; the child is inundated with proposals, suggestions and demonstrations of what to do and how to do it. Of considerable interest in the present study is the extent to which mothers use an elaborative style when they enter the child's play. Although Factor 7 accounts for relatively little of the variance (6%), it loads high on the measure of mother's elaborative play. It is noteworthy that an elaborative play style is relatively independent of the mother's overall level of activity.

Stability coefficients for mother factors were moderate (Table 5, Appendix F), especially in comparison to those obtained for child factors. Maternal sociability showed the most persistent stabilities between successive age periods from 12 to 24 months and mothers' 12-month scores showed a small positive correlation with 30-month scores ($\underline{r} = .21$). Maternal Dominance showed the strongest stability over a year-and-a-half spread ($\underline{r} = .39$ between 12 and 30 months), and Maternal Passive-Responsiveness showed low but persistent correlations between successive age periods.

As indicated earlier, the factor analysis was used to derive a reduced set of variables likely to reveal distinctive patterns of development between 12 and 30 months. A Sex x Curriculum x Age analysis of variance was performed on each factor score.[1] Correlational analysis examined relations between mother and child factors within and between age levels. Additional analyses examined variables such as birth order, parental education, maternal IQ (PPVT and WAIS), and family background variables (length of residence in New Haven, etc.). Statistical procedures and results will be discussed in the sections which follow.

Patterns of Change: Mothers and Children

At least on the behavioral surface, the post-infancy period is marked by the appearance of strikingly new capabilities which rapidly assume adult-like characteristics. As children's language acquires the subtleties of mature forms, it begins to supercede non-verbal forms of communication. As children's sensory-motor activities become enriched by representational, imitative and combinatorial skills, play begins to acquire the refinements found in the make-believe and constructive games of older children. According to some investigators (cf. Kagan, 1975), social behaviors also undergo important changes during this period. Attachment behaviors toward the mother peak then taper, whereas spontaneous social gestures (such as the use of objects in social encounters) make their first appearance (Maudry & Nekula, 1939).

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[1] When main effects or interactions attributable to age were significant, additional analyses of trends using the MANOVA procedure suggested by McCall (1974) were performed.

In the analysis of developmental trends, two questions were of special interest. First, we asked whether the behaviors of mothers and children showed distinctive patterns of change during the year-and-a-half period. Do some functions increase while others decrease? Are some trends marked by dips, others by spurts and others by relatively stable increments and decrements? Second, we asked whether there was any congruence between the changes of mothers and the changes of children. For example, the analysis of individual variables suggested that mothers might be relatively active and assertive model-tutors when their child's language or motor skills are rough and poorly organized, but that they become less active but more responsive as the child's skill increases. Indeed, the language curriculum was built on the premise that a shift from mother-as-model to mother-as-responder represented an optimum strategy for promoting language development. In the discussion which follows, we examine patterns of change over the year-and-a-half period.

The mean standardized scores for child factors at each age level are indicated in Table 13. Significant age effects appeared on four of the six factors analyzed; on two of the child factors--Functional SS Competence (Child Factor 1) and Sustained Problem Solving (Child Factor 2)--the level of significance was well beyond the .001 level. The developmental curves plotted in Figure 3 indicate notably different patterns of change which reflect the large linear trend for Factor 1 and the large quadratic trend for Factor 2. Not surprisingly, the factor which represents children's symbolic acquisitions, advanced play forms, and sociability toward unfamiliar persons shows a dramatic increase between 12 and 24 months. In contrast, the more stylistic-attitudinal factor shows a decline during this period even though it contains positive loadings for individual behaviors which increase during this period. The curves seem to represent strikingly different developmental functions. In the growth of Functional Competence, the exercise of new structures was inextricably linked to their acquisition.[1] However, the rapid rate of growth was accompanied by an emotional-motivational by-product. It was in the ability to engage in sustained, difficult problem-solving activity and to cooperate in tutorial type exchanges that the children revealed the often noted acute disruption of behavior summarized in the phrase "the terrible twos."

Table 13 and Figure 3 here

However, note the reversal between 24 and 30 months. At 24 months, when the rapid rate of structural change tops out, the pace of motivational disorganization bottoms out. In the 6-month period between 24 and 30 months, the stabilization of structural growth is accompanied by a precipitous increase in the child's ability to sustain cognitively challenging activities in spite of substantial amounts of failure. With respect to these two developmental strands, 24 months seems to be a watershed age. Thereafter, the child's way of doing things, his style of functioning, becomes commensurate with his recently acquired competence.

Table 14 about here

Included in Figure 3 are two curves of maternal factors which show developmental trends similar to those of the children (see Table 14 for mean scores on maternal factors). Mothers' scores on Articulate-Non-directiveness show a linear increase between 12 and 24 months. Although the rate of increase is not as rapid as the rate shown by the children on the Functional Competence factor, the two scores are significantly correlated. At 12 months, when the language and play repertoires of the children are relatively limited, the mothers tend to be relatively directive and controlling, and the language they use with their children tends to be simple, with few complete sentences and little description. The mothers show a slower rate of change than the children between 18 and 24 months, as if the mothers were gradually dropping behind as the children surged forward. Although differences in adjacent 6-month periods between 12 and 24 months are significant for mothers and children, the difference between 24 and 30 months is not significant for either group.[1] By 30 months, the mothers reconstitute their earlier directive pattern so that now, relatively complex language is used with far less directiveness.

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[1] Although curriculum effects modified the relative steepness of the increase, the trend for each group between 12 and 24 months was essentially linear.

The curves plotted in Figure 3 reveal another congruent pattern. Mothers' tendency to use a relatively passive style plummets at 24 months as the children become diffuse and disorganized. In other words, mothers become more active and assertive as their children become less task focused, less pliant and more demanding. Then, as the children recover, the mothers seem to relax, once again returning to the earlier more passive mode. A significant quadratic trend also dominates the child's tendency to maintain proximity toward the mother in an unfamiliar situation. Proximity maintaining behaviors peak at 24 months, on what seems to be a developmental complement to the collapse of achievement oriented problem solving at that age level. It should be noted that the two measures derive from different situations, so that the connections are not produced by a measurement artifact.

The trends analysis also indicates that several maternal behaviors show a significant decrement over the year-and-a-half period.[2] Maternal sociability declines between 18 and 24 months but shows little change between other 6-month intervals.

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[1] The trend between varies according to curriculum group. These data will be discussed in a later section.

[2] The decline appeared in all groups, although the rate, timing and terminal level varied for M. Sociability and M. Directs vs. Questions.

Note, however, that social mutuality increases as if the structure of mother-child interactions changes from a temporally spaced out system of initiating-responding "interactions" to temporally condensed chains of "transactions." Maternal reliance on simple verbal reinforcements and verbal directiveness also show significant linear declines, although the latter increases slightly between 12 and 18 months (thus producing a modest quadratic trend). Again, it is important to note that between 12 and 30 months, the behaviors of mothers are as much in flux as the behaviors of children.

Two general themes emerge from the preceding analysis. The first is that it may be necessary to distinguish between behavioral changes which reflect the child's acquisition of new capabilities and the emotional-motivational by-product of an abruptly expanded repertoire. On the one hand, between 12 and 24 months new semantic and syntactic forms, new ways of handling objects and social occasions enter the child's repertoire and come to function as effortless and essential constituents of spontaneous behavior. On the other, the period of most rapid growth is accompanied by increasing task disorganization, susceptibility to failure and social abrasiveness. For the young child, it may be one thing to be the possessor of new technical powers, but quite another to orchestrate and synchronize the application of these powers.

The second theme is that maternal behaviors show patterns of change as striking as those of the children. If children show peaks and troughs, so do the mothers. Mothers were the least controlling and the most verbally articulate when the children displayed the highest level of competence. An unexpected finding was an overall decline in maternal socability based on the type of social interaction in which initiating and responding social exchanges between mothers and children undergo a qualitative change characterized by longer episodes of reciprocal exchanges. These episodes are sustained interactive sequences in which initiating and responding behaviors have become so condensed and interdependent that they are best viewed as a series of reciprocal, contingent transactions. In other words, between 12 and 30 months, mothers' social behavior toward their children becomes less a matter of brief social gestures such as a fleeting smile and occasion-governed attentions to the children's needs for comforting, help or entertainment. As encounters become less episodic, their content changes. The child's new skills support -- perhaps even dictate -- a transition from "verbal interaction" to "conversation," from the brief exchanges of "giving," "showing," and "helping" to elaborate social games, from echoic imitative gestures to playful and sometimes serious cooperation in household activites.

Sex Differentiating Patterns

If girls are verbally more precocious than boys (Maccoby & Jacklin, 1973), verbal precocity might be one component of a more extensive cluster of skills which differentiate the sexes. If boys are more vigorous or object-oriented than girls (Goldberg & Lewis, 1969; Clarke-Stewart, 1973), these tendencies might be indices of a more general activity style. Our analysis of individual variables revealed a number of differences related to sex. The question is whether differences would appear for broader patterns of behavior. Mean scores for child and mother factors which revealed sex differences are shown in Table 15.

Put Table 15 about here

Consider first the Functional Competence factor which contains positive loadings for relatively mature forms of language, play and social behavior. At 12 months, boys and girls did not differ significantly (in fact, boys, scored somewhat higher than girls). However, by 18 months, girls score higher than boys ($p \leq .01$) and the differences are sustained over the following year. The shape of the developmental function is essentially quadratic for both sexes. In other words, the differences derive primarily from the girls' more rapid rate of development of emerging functions between 12 and 24 months (see Figure 4). As might be expected from earlier analyses (e.g., individual measures such as the Bayley Mental Scales and Stanford-Binet, social object exchanges and sociability to stranger), girls score higher on the Test Competence[1] factor than boys, beginning at 12 months of age.

Put Figure 4 about here

Sex differences in children's specific vs. diversive style of exploration supplants the rather fragmented image of stylistic differences which emerged from the analyses of individual variables. Boys tend to focus on a particular, favored object upon which they exercise a wide array of different and rapidly changing activity schemes. Their activities tend to be developmentally egalitarian -- immature activities (banging, shaking, pulling) are as likely to appear as the more advanced combinatorial activities. Whatever the particular object or whatever the particular from of action, children who score high on specific exploration are utterly preoccupied with what they are doing. The contrasting pattern is exhibited by girls. Their activity style tends to exhibit more diversity in the objects they contact, a slower pace and more emotional lability. It should be noted that children of both sexes show a tendency to become more diffuse and irritable at 18 months.

Differences in mothers' behaviors related to the sex of the child is as controversial as differences in the behavior of children. The present findings support those of other researchers who report that in late infancy girls' mothers tend to be more directive and dominating (Clarke-Stewart, 1973). This characterization, however, holds only between 12 and 18 months. By 24 months the direction of the difference is dramatically reversed. Girls' mothers become less dominating whereas boys' mothers become more so, a difference which persists over the next 6 months, although maternal dominance generally decline.[1] The interaction between sex and age is plotted in Figure 5.

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[1] These differences appeared in five groups but were reversed for children in the Mother Only group.

Put Figure 5 About Here

In sum, sex differences favoring girls appear on two factors which index children's competence -- girls are not only better test takers, but their spontaneous behaviors tend to reflect a more rapid development of linguistic, cognitive and social forms. Mothers are considerably more bossy toward girls at 12 and 18 months but then shift gears, easing up on the girls and bearing down on the boys (Minton, Kagan & Levine, 1971). To what extent does maternal dominance at 12 months influence girls' superior performance at 18 months? To what extent are initial maternal differences and later shift in maternal behavior provoked by the boys relative immaturity and the girls' relative precocity? Later sections will examine data pertaining to the interconnections between sex-linked maternal and child behavior.

Birth Order Effects

It became evident soon after the home visiting program began that whether the child was first or second born might make a substantial difference in the effectiveness of the program. Although the initial selection criteria limited the sample to first and second borns, the group was not blocked on this variable. The final distribution of 65 first borns and 35 second borns, reflected the distribution found for families drawn from the same hospital records but not contacted to participate in the present study.

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[1] Although maternal dominance showed curriculum variations, the pattern of sex differences was not modified.

Previous research on birth order has been far more concerned with children than parents (Bayley, 1965; Altus , 1966). For the most part, the available data suggest that first borns do relatively better in adult managed achievement situations, whereas second borns are relatively more oriented to social involvement with peers (Sampson, 1965; Sutton-Smith & Rosenberg, 1970). Few studies have examined birth order effects on behavior measures during infancy, although it is often assumed that differences begin at appear early in life.

The present analyses revealed marginally significant differences in children's Social-Symbolic Competence ($\underline{p} = .056$) favoring first borns (Table 16). Although the interaction with age was also only marginally significant ($\underline{p} = .089$), mean scores suggest that differences make their first appearance at 18 months, increase between 18 and 24 months, and remain stable thereafter. With respect to early symbolic development, second borns seem to gain few advantages from the presence in the household of an older sibling who tended to be on the average only two years older.

More striking differences appear in maternal sociability. In accord with other findings, mothers are considerably more socially stimulating and responsive toward their first borns at every age level (Hilton, 1967). However, maternal sociability is somewhat modified by the sex of the child ($\underline{p} = .059$). For first born children, the difference between boys ($M = .13$) and firls ($M = .15$) is small. It is the second born boys ($M = -.62$) who receive considerably less social stimulation than second born girls ($M = -.08$).

Although mothers are less sociable toward their second born children, they do not necessarily ignore them. Although again only marginally significant ($\underline{p} = .056$), mothers tend to be more directive with their second borns.

Put Table 16 About Here

Developmental Trends: Summary and Discussion

It is apparent from the preceding discussion that behavioral changes between 12 and 30 months follow no single or simple developmental trend: Some behaviours show fairly steady increments, then taper off; others show decrements, while still others are characterized by plateaus, peaks and dips. For the most part, measures which reflect the child's acquisition of new behavioral structures -- components of language (such as answers or nominals), play (pretend or two-object combinations), or social behavior (exchanges with an unfamiliar person) - show a rapid rate of change during the second year, which levels off between 24 and 30 months. The 24 to 30 months plateau may reflect several factors. Children may enter a period of consolidation in which newly acquired forms are practiced and refined in diverse new situations. If so, our research scenes should have been expanded to permit us to examine the diversification of skills (e.g., to include the child playing with peers as well as playing alone or with his mother, or observations of a broader sample of unfamiliar adults). It is possible, too, that our measures were insufficiently sensitive to changes after the age of two (e.g., MLU might be a better measure of language complexity for older children or new and more subtle problem solving or social strategies might emerge which are not represented in the units used to observe play of social behavior). None the less, multivariate procedures helped to identify patterns of related behaviors which apparently follow a comparable course of development during the year and a half period. The factor which seemed to represent structural changes in children's social and symbolic competence transcended our initial division of behavioral systems into language, play and social development. Although language, play and social behaviors can be distingished, the distinction may be more a matter of convenience than a psychological reality. At least some aspects of these behaviors seem to share common structural attributes (such as appears in child Factor 2 which groups together stylistic aspects of language and play).

Maternal behaviors also change as the children get older. As we noted earlier, it no longer seems reasonable to consider mothers and children as behaviorally independent organisms. Although it is possible to examine the relative contributions of each to a given outcome, such analyses are imposed upon a system in a state of continuous flux; the influential force of one member may simply prepare the way for the counter-influence of the other.

The foregoing analyses leave little doubt that boys and girls differ, that some differences are already evident at 12 months of age and that some were maintained over the following year and a half. Boys favored a specific style of exploration, whereas the girls favored a more diversive style. The girls' greater interest in social matters was associated with higher levels of performance in a test situation requiring interactions with an unfa[illegible]r examiner. The results of univariate analyses were neatly summariz[illegible]n the analyses of multivariate factors which grouped together those individual measure which shar common underlying properties. Mothers differed in how they interacted with boys and girls, but maternal differences reversed direction between 18 and 24 months. At 12 months, mothers were more directive and intrusive toward girls but the maternal dominance decreased for girls and increased for boys. The change came on the heels of a decline in the boys' Bayley scores, whereas the change follows an improvement in test scores for girls. The U-shaped function for boys, suggests that the variables which govern maternal dominance change substantially over the year and a half period. One possibility is that when children are relatively immature, mothers are easy going; they expect little and make few demands. Then, as the children begin to acquire language, sophisticated problem solving and social skills, mothers beomce more directive and intrusive; they expect more and get more. Finally, when the child display a high level of mastery, when his language permits extended conversation and his interests lend themselves to sustained periods of activity, mothers again change. Unobtrusiveness during the third year may support the development of competence combined with independence. Although this nicely illustrates the notion that a viable model of children's development should contain provisions for a feedback loop, the data presented thus far do not preclude alternative explanations which call upon the role of environmental pressures toward sex-typed socialization. Whether mothers, for example, are less accepting of their boys' behavior because boys are less compliant (Minton et al, 1971), or whether the mothers are reacting to cultural pressures and socio-affective anxieties, or whether both facotrs operate as a chain of effects the plausible alternatives which our data cannot resolve.

CHAPTER IV CURRICULUM COMPARISONS

Data Analyses

The 100 mothers and children who participated in the present study changed dramatically over the year-and-a-half period. We turn now to the question of whether these changes were modified by one or another aspect of our educational program. Of special interest are those aspects of the program which focused on the child's primary caregiver as a crucial force in the child's moment-to-moment interactions with people and things during the early years. Implicit in a parent-education strategy is that the parent (or parent substitute) is a central contributor to the child's development and that changes in parental behavior support or induce changes in child behavior. As described earlier, three curriculum and three comparison groups were designed to investigate how particular features of home-based educational programs might influence the behaviors of mothers and children.

First, we wanted to know whether curriculum materials stressing either language, play or social development would have differential effects. The three core curricula shared a common perspective (i.e., a three way interaction between home visitor, mother and child) but differed in specific content. The materials designed for curriculum comparisons called upon the fine details of what is currently known about early language acquisition, the cognitive underpinnings of play, and the form and complexities of social-emotional behavior to produce three curricula--a Language Curriculum, A Play Curriculum and a Social Curriculum--which were presented to three independent groups of mothers and children (Language vs. Play vs. Social).

Second, we wanted to examine whether concentrated, direct contact between the child and a trained home visitor which excluded the mother was more effective than an equally concentrated focus on the mother which excluded the child. Thus in two comparison groups, the interactive mode was dyadic. the home visitor functioned either as the child's playmate and tutor (Baby Only) or as the mother's friend and child development consultant (Mother Only). The dyadic groups were patterned after early home-based intervention studies which stressed either the child (cf. Schaeffer, Furfey & Harte, 1968) or the mother (Levenstein, 1970).

Third, we wanted to know whether the interactive mode of the visits (i.e., dyadic vs. triadic) made a difference. In the dyadic groups (Baby Only and Mother Only) the effort was to delete either the mother or the child from the relationship with the home visitor. In the triadic groups (Language, Play and Social) the curriculum materials were designed to encourage a three-way pattern of interaction between home visitor, mother and child; more accurately, to balance the ongoing interchanges between all three so that whoever was deleted at one moment could be a participant the next. On pedagogical grounds, one would expect a triadic pattern to be a more effective learning condition for the mother and provide a better teaching situation for the home visitor. In a triadic situation, the home visitor has available an ongoing, illustrating context in which her own behaviors and those of mother and child can become concrete instances of curriculum themes. To the extent that the home visitor is sensitive enough to take advantage of the here and now, and agile enough to reshape the inevitably abstract and linear curriculum units by exploiting moment-to-moment happenings, the mothers should be better able to understand and use concepts which stress the role of environmental contingencies, reciprocity and flexibility in children's early development.

Finally, we wanted to know whether the mere presence of a friendly, sympathetic outsider in the home would make a difference. If loneliness and isolation is a major influence in the lives of middle and low income parents, the opportunity for regular contacts with a warm and interested home visitor might be extremely consequential no matter what else the home visitor did.

The above questions guided our analysis of the data. Orthogonal contrasts were used to make relevant comparisons: All groups vs. Test Only, Triadic groups vs. Dyadic groups, Baby Only vs. Mother Only, and Language vs. Play vs. Social. Although individual variables revealed significant differences, it became prohibitively large to evaluate individually: First, because a certain number of significant effects could be expected by chance alone; second, because the complicated trail of individual variables over sets of contrasts would be likely to yield a fragmented picture of the results; and finally, because the reduced set of 54 variables were sufficiently intercorrelated so that the distinction between significant and non-significant differences could easily obscure fairly general patterns.

Longitudinal analyses pose innumerable problems, not the least of which is the statistics of repeated measures designs (McCall & Appelbaum, 1973). Although the most feasible solution, multivariate analyses of trends, imposes a model which can be unduly limiting for an exploratory study, it was the solution adopted here. Each dependent variable (i.e., 6 child factors and 7 mother factors) was converted into a set of three trends--linear, quadratic and cubic. The three trend scores were then entered as dependent variables into a multivariate analysis which yielded multivariate _F_-ratios for each Curriculum Trend contrast with univariate _F_-ratios for each trend. In the present study, the longitudinal analysis has a special significance in view of the gradual phase out of home visits. Home visits occurred weekly during the first six months, bi-weekly during the second six months, and monthly during the last six months of the program. Typically, intervention studies exhibit strong effects immediately following the participant's most concentrated involvement in the program, and then an attenuation of effects once the program has been terminated. A gradual phasing out of program contacts seemed to make sense--clinically, as a way of easing the stress of breaking what had become in many cases a close and warm friendship between home visitors and families, and, programmatically, as a way of building into the program procedures which hopefully would maintain effects despite reduced contacts with the home visitor.

Families were randomly assigned to treatment and control groups. Although none of the pretest measures, family background indices, or maternal IQ measures revealed differences larger than would be expected from a random assignment ($p < .20$), group means are worth noting because the magnitude of the differences between extreme scores is occasionally large enough to be significant if tested separately without appropriate adjustments (Appendix F, Table 20). However, there were differences, some of which could contribute to the magnitude of the interactions with age. In the following analyses, pretest scores were used in an analysis of covariance whenever an interaction with age was significant.

Home Visits: As They Were

In our master plan for the home visits we projected a year-and-a-half program which would gradually phase out over successive 6 month periods. Curriculum materials for each of the 32 visits were designed to cover about an hour's worth of activity in the home, and the visiting schedules of the home visitors allowed approximately an hour per visit. Taking into account travelling and planning time, we felt that it would be possible for a home visitor to manage at the most 3 visits per day, so that a maximum case load of 10 families and weekly visits did not seem unduly burdensome.

The reality differed notably from the original plan. As indicated in Table 17 the Mother Only group consumed an inordinate amount of time (almost an hour and forty minutes at one point), especially when compared with the Baby Only group. According to the home visitors' notes and commentary, Mother Only visits required immense tact and diplomacy--some mothers had pressing personal problems (with family, husband, or Welfare Department) whereas a few mothers strained the home visitors' conversational skills with long silences, or monosyllabic responses to leading questions and discussion probes. Some mothers wanted to talk about everything but the children, whereas others used the home visits to scrutinize every detail of the child's life. After the first eight visits, most home visitors found themselves staying longer, fewer visits were missed, especially when visits were bi-weekly. Mother Only visits often became socializing occasions--they took place in the kitchen with a cup of coffee and sometimes lunch; the fine boundary between the home visitor as professional consultant and friend was a difficult one to maintain.

Table 17 about here

As might be expected, Baby Only visits presented vastly different problems. At 12 months, very few children were able to sustain an hour long period of interaction with an adult; sessions were interrupted by the children's frequent journeys to seek out the mother, which tended to become more frequent and lengthy as a visit progressed. Early in the home visit series, home visitors considered themselves fortunate if they could extend a visit to an hour with as much as 10 minutes of contact with the child. The child's attachment to the mother was expressed in the "secure base" phenomena (cf. Ainsworth & Bell, 1970 ; Bowlby, 1969; 1973), a case of a treatment format out of synch with a child's developmental level. It was only gradually, after many weeks of patient persistence, that home visitors were able to engage the child in sustained periods of activity. It should be noted that although there were differences within triadic curriculum groups, the physical presence of the mother and her interactions with the child created a vastly different visit situation. The children were not necessarily in constant interaction with the adults, but they were rarely more than a few feet away. Nonetheless, language visits tended to take less time than play or social visits. In fact, the length of language visits declined abruptly (by 20 minutes) just as most children in the study began to speak--as if with "success," mother and home visitor lost interest in the effort.

Scheduled visits were often cancelled--sometimes because of illness, weather or family emergencies, occasionally because the mother simply forgot. In order to maintain the assessment sequence, home visitors frequently were not able to reschedule visits, so that sessions had to be condensed to cover more than one week of activities. The proportions of missed visits (per 16) was never less than 7% (Baby Only) nor more than 22% (Play). Fewer visits were missed in Baby Only and Mother Only groups--and over time, missed visits increased in the former but decreased in the latter. Evidently, Mother Only visits not only take more time, but they are also more likely to occur. Visits in the core curriculum groups were subject to relatively more disruption, in part, because both mother and child had to be present and able to participate. However, mean exposure time to the curriculum, with the exception of the Mother Only group , was relatively uniform. As home visitors accommodated to exigencies as varied as flu epidemics, vacations, snow, birth, and family crisis, as they juggled the hours and days of a demanding schedule, they were able to adhere remarkably well to the intentions if not the details of our early projections.

The Core Curricula: Language, Play and Social

The children. One purpose of a curriculum comparison was to examine the extent to which one could demonstrate the differential sensitivity of developmental functions to particular environmental influences.

During the period of most rapid growth, children's development of functional competence--their acquisition of linguistic, cognitive and social skills--was influenced by curriculum procedures. From an inspection of change scores over the 12 month baseline (see Figure 6 and Appendix F, Table 6 for group means), it can be seen that the language curriculum considerably accelerated the early development of functional competence; language and play children performed better than social children at 18 ($p = .014$) and 24 ($p = .045$) months (although the Test Only group did not fall behind until 24 months). However, the acceleration of language and play children appears to have depended on the frequent presence of the home visitor. In keeping with the significant quadratic interaction, language and play groups show a small decline between 24 and 30 months, whereas the development of children in the social group continues at a somewhat slower rate. Indeed, at 30 months, differences between curriculum groups are not significant. If, as we have argued previously, the functional competence factor reflects children's acquisition of fundamental structures, the 24 - 30 month attenuation is not surprising. Children may differ in their acquisition rates, and under some circumstances might show precociously high levels of performance. But all children eventually acquire these structures; apparently, when specially enhancing circumstances are withdrawn, differences evaporate and children function at a level commensurate with their developmental level. Is it the case, then, that functional competence, as we have defined and measured it in the present study, is purely a matter of maturation? In a later section, we examine some of the early

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Figure 6 about here

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maternal influences on children's 30 month scores. It is clear, however, that insofar as intervention effects are concerned, the inflation of language and play scores at 24 months does not withstand the withdrawal of the home visitor.

Children's interactive-proximity seeking behaviors toward the mother, predominantly during the waiting room episode in the laboratory, were also sensitive to curriculum influences. The significant cubic trend, depicted as changes over the 12 month baseline in Figure 7 reflected a complex interaction between curriculum group and age. Between 12 and 18 months, the interactive-proximity seeking behaviors of the language children increased, whereas those of play and social children decreased. The latter groups showed a belated increase at 24 months, when the language children were becoming less interactive; although language and play children are somewhat more involved with their mothers than social children, the differences are not significant. By 30 months, language children show a considerable increment over their 12 month scores, social children show a decrement, whereas play (and Test Only) children move close to the 12 month baseline. One might argue that with respect to the overall pattern of change, the language children are advanced; their attachment behavior peaks at 18 months, whereas children in other groups peak at 24 months. It is important to note, however, that the language children generally maintained a higher level of interaction with the mother than did social children, and that they exceeded play children at two ages; play children, in turn, exceeded social children at 24 and 30 months (see Appendix F, Table 6).

Figure 7 about here

The waiting room situation was not a stranger probe; children are not choosing to interact with the mother rather than a stranger, and the children's heightened involvement with the mother is not linked to stranger anxiety. It also seems unlikely that children were responding to fear engendered by the novelty of the toys. Rather, the particular behaviors which entered into the interaction-proximity factor (+social object actions, +expressive behavior, -object contact, -MC distance) suggest that the children who received high scores simply enjoyed interacting with their mothers. Note also that the 30 month scores reflect curriculum differences which appeared at 24 months on the more structural measure of competence. Although speculative, it is possible that children's general communicativeness and interest in the mother at 30 months when no observer is present is an applied counterpart of earlier differences in competence, an application which has little to do with particular language froms, for example, but more generally to do with the use of language in interpersonal exchanges.

The mothers. Some support for our interpretation of curriculum effects on the children come from the maternal factor, Articulate-Nondirectiveness. Change scores over the 12 month baseline are plotted in Figure 8, (see Appendix F, Table 7 for mean factor scores). It is evident that changes in the mothers did not reflect curriculum influences until the children were 30 months of age, after home visits had been reduced to a monthly basis. It is important to note that none of the measures which entered into this factor were obtained in situations which yielded high loadings on the child's interactive-proximity seeking behavior. In other words, the 30 months distribution of curriculum groups on these two measures is not a situational or measurement artifact. At 30 months, language mothers were more sophisticated in the language they used with their children than play mothers, who, in turn, were more sophisticated than social mothers. They were also less intrusive and directive in their interactive style. It would appear as though differences in some maternal behaviors might require a well-established competence in their children in order to become manifest -- so that, in a sense, maternal interactive style might lag behind, and be in response to, changes in the children.

Figure 8 about here

Note, however, that although at earlier ages social mothers performed somewhat better than mothers in the other groups, they show a trend reversal between 24 and 30 months. Although the linear trend for the curriculum effect is marginally significant, group differences are also carried by a quadratic trend which reflects the decline for the social mothers during the last 6 month period. In the absence of support from the home visitor, social mothers apparently reverted to an earlier pattern of restricted language and intrusive interaction.

In what way might the curricula have produced these changes? Although language and play curricula used different materials, and examined nominally different aspects of children's behavior, they yielded indistinguishable linear trends and terminal scores which exceeded those of the other groups. Yet, overriding the many specific differences, language and play curricula shared a common, structural framework. In the language curriculum, the units of discussion were the elements of language--nouns, verbs, modifiers; people, things, actions and relations among these. In the play curriculum, the units were more simplistic, yet can be viewed as the non-verbal structural counterparts of objects and actions (cf. Bruner, Oliver & Greenfield, 1966). Even more, both curricula dwelt on the apparent intentions of either the child's language or his activity and both attempted to sensitize the mother to the structural and intentional aspects of her child's behaviors. In many respects, the social curriculum shared a comparable point of view. But the issues enveloping children's social development are vastly different from those which appear in language and cognition; the connections between the acquisition of social rules, socialization pressures, interpersonal transactions and linguistic-cognitive skills are obscure and complex. The social curriculum had to address the elusive questions of goals for the child, sex-stereotyping, social values and emotions. The social curriculum had to introduce such abstract interactive constructs as "reciprocity," "contingency" and "social reinforcement," in the absence of a structural framework as elegant as linguistic analysis or as obvious as play.

In a sense, the social curriculum was handicapped by the current emphasis on process over structure in studies of social development. It appears as though mothers in the social group could adopt the mix of verbal sophistication and non-intrusiveness only as long as the home visitor was available to interpret or model the social curriculum's rendering of these, as though the curriculum provided too little of the general understanding which might lead to more enduring gains.

Two additional findings are worth noting. Two maternal factors revealed curriculum main effects which did not interact with age, but which appeared between 12 and 18 months, were sustained over the following year, and were not eliminated by an analysis of covariance using 12 month scores. Beginning at 18 months, language mothers (M = .35) exhibited more social mutuality when interacting with their children than did play (M = -.06) and social (M = -.05) mothers (p = .03). Language mothers also avoided an intrusive verbal reinforcement style of interaction (M = -.32), whereas play mothers (M = .02) were more likely to use this style than social (M = -.14) and language mothers (p = .01). Play mothers were more prone than mothers in other groups to accompany their frequent entries into their children's activities with words of encouragement and approval, perhaps an effective means of supporting children's activity, although not exactly the elaborative style promoted by the play curriculum.

In summary, comparisons of the three core curricula indicate that the social curriculum seems to have had the weakest influence on the behaviors of mothers and children, whereas the language curriculum seems to have had the strongest, most pervasive impact. Although the differences are clear, their implications regarding the respective contributions of home visitor and mother are not.

An underlying though often implicit assumption of parent education programs is that the chain of influence proceeds from parent educator ⟶ mother ⟶ child Chilman, 1973; Lambie, Bond & Weikart, 1974). Our findings, however, yield little support for that assumption. For example, suppose we argue that the mother's language and style of play influences her child's symbolic and cognitive development. According to a highly simplified parent education model, changes in the mother's behavior should precede, or at least be contemporaneous with changes in the child's behavior.[1] Some of our findings are not in accord with a linear parent education model: e.g., changes in children's symbolic competence preceded by several months changes in the maternal style which, on the surface, would appear to be the most relevant to the child's acquisition of mature symbolic and cognitive structures. Indeed, it appears as though the mothers respond somehat belatedly to the children's level of functioning at an earlier age. Furthermore, group differences in the children seems to have been dependent on the curriculum in combination with the frequent presence of the home visitor; between 24 and 30 months, when visits are down to a monthly schedule, the enhanced performance of language and play children take downward turn, whereas the social children move steadily forward. In other words, in the hands of the home visitor, the language curriculum was able to eleva te children's performance, which the mothers were not able to sustain even though they eventually were using the right "techniques."

For these data, it seems necessary to abandon an overly simplified view of maternal and child change. Those elements of language, play and social behavior grouped together in the factor we call "Functional Social-Symbolic Competence" may be structural elements which all children acquire and which appear in their spontaneous behavior (in contrast to their tested behavior). If so, the precocity of the language children, induced by the combination of home visitor and curriculum, might have come from the use of mature forms which were not truly assimilated, and which, perhaps, could not be assimilated as such an early age. The precocity thus appears only on the surface, and only when buttressed by the enriched stimulation of a skilled practitioner. If some aspects of growth are fundamentally maturational, reflecting a biological schedule of development, it would be unreasonable to expect profound and enduring changes from a relatively modest environmental intervention. Of course, it is possible that maternal differences which appear at 30 months might have implications for children's later development; unfortunately our data do not permit this possibility to be explored.

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[1] Although the issue has not received serious attention, and parent education

Non-structural dimensions of child and maternal behavior responded to curriculum variations, and it may be that behaviors which reflect social-interpersonal styles are more amenable to environmental interventions. Although exceedingly labile between 12 and 30 months, children's interest in communicating and sharing with the mother was generally higher for language children than social children, and language mothers tended to engage in relatively more mutual, reciprocal exchanges, avoiding a language style dominated by language impoverished verbal reinforcement. If there is any synchrony at all between mothers and children, in the differential effects of the core curricula, the synchrony seems to appear in an enhancement of moment-to-moment, ongoing exchanges between mother and child. Although not without some necessary qualifications, the pattern of results suggest that, for the most part, mothers and children in the language group had a great deal to do with one another; that their exchanges were relatively rich and prolonged. Mothers and children exposed to the play and social curricula tended to do less well, although the play group produced higher soores at 24 and 30 months.

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programs rarely measure both parent and child behavior, the problem is a crucial one methodologically (involving the psychometrics of maternal and child measures) and conceptually (involving a model of interacting change processes).

Sex and the Curriculum: Baby Only vs. Mother Only

In the earlier section we described some patterns of sex differences which appeared between 12 and 30 months. For the most part, girls received higher scores in Test Competence than did boys--the difference appeared at 12 months and was not substantially modified over successive test points. However, in one case a curriculum treatment qualified the generality of this finding. Note the significant sex by curriculum interaction resulting from the trends comparison between Baby Only and Mother Only groups (see Table 18). Mean change scores over the 12 month baseline are plotted for boys and girls in Figure 9.

In spite of our home visitors' liberated personal beliefs, their close relationship with the children supported and possibly enhanced test taking superiority for girls while only slightly modifying the decline for boys (although relative to Test Only children, children of both sexes received higher scores). The irony is that the only instance of a reversal appears at 30 months for the Mother Only group, a group in which the home visitor's treatment of attitudes toward children and sex stereotyping was more abstract and academic. Note that the positive trend shown by the Mother Only boys is balanced by a negative trend for the Mother Only girls which reverses the pattern found in other groups. Apparently, the home visitors delivered two quite different messages: one when they dealt directly with the mother and another when they functioned as a model or interacted with the children. It appears as if home visitors adopt different stances toward boys and girls, one in adult - adult interactions and another in direct interactions with the children.

Table 18 and Figure 9 about here

Moreover, the Sex X Curriculum effect is linked to age: at 18 months a significant interaction ($p = .03$) reflects the enhanced performance of Baby Only girls relative to Baby Only boys and diminished differences between Mother Only children; 24 months appears to be a reordering period, and differences are no longer significant, whereas by 30 months the reversal for Mother Only children appears clearly and significantly ($\underline{p}$ = .009).

Some additional clues regarding how Baby Only and Mother Only conditions influenced the children and the mothers come from two other interactions with sex which yielded significant linear trends. In support of our earlier suggestion that Test Competence contains a strong social component, consider the way children's social interaction and preference for the mother changed in Baby Only and Mother Only groups. The attachment behaviors of girls in the former group shifted markedly away from the mother between 12 and 18 months; that is, during the home observation they initiated fewer social contacts with the mother, showed less affection and less responsiveness toward her and displayed more interest in the unfamiliar observer. The progressive detachment of Baby Only girls is comparable to the progressive detachment of the Mother Only boys, whereas the reverse pattern--increased positive behaviors toward the mother is shown by the other groups. It would appear then, that by 30 months, children's performance in a standardized test situation is governed by the extent to which their earlier focus on the mother as a primary source of support and stimulation has been replaced by a positive and warm interest in new and unfamiliar people. Apparently, the home visitor's relations with Baby Only girls mediated this transition--i.e., having had a close and satisfying relation with one non-family female may have provided a bridge to other females, the unfamiliar examiner who tested the child, or the unfamiliar observer who recorded mother-child behavior in the home.

However, clinical observations by the home visitors suggest that they had considerable difficulty managing play sessions with Baby Only boys. The home visit postscripts vividly relate how the home visitors struggled--one boy would play only with balls, another moved the home visitor's toys to a corner where he played by

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himself, another spent innumerable visits climbing on the furniture, racing around the room, generall out-of-touch with his dismayed playmate. Boys seemed especially prone to the back and forth, periodic and repeated reestablishment of contact with the mother. Considering changes in the mothers' sociability with the children, it is possible that the mothers might have contributed to the home visitors' difficulty. Although in the Mother Only group (and in Test Only as well) the mothers' sociability toward boys declines markedly over the year-and-a-half period (a decline often accompanied by poorer test performance and reduced preference for the mother), the trend is attenuated for boys in the Baby Only group; that is, the home visitors' attempt to befriend the boys may have provoked in the mothers increased nurturance and maternal attention, whereas the home visitors' warm relation with the girls may have quickened the pace of maternal detachment. Put another way, although between 12 and 30 months mothers generally distance themselves more precipitously from their male children than from their female children, the presence of a possibly competing maternal figure may disrupt the process. Even though mothers ordinarily pursue a policy of detachment from their boys, they may not countenance their replacement by a maternal substitute. If home visitors found it difficult to establish an effective working relationship with Baby Only boys, part of the trouble might have stemmed from exceedingly subtle obstacles introduced by the mothers which served to maintain close contact with their boys while precluding the development of a close relation with the home visitor.

Although the mothers might have played an active role in maintaining social contact with their boys (home visitor ⟶ mother ⟶ child) it is equally possible that the boys were not socially mature enough to manage a close, intensive relation with an unfamiliar female, and dealt with the situation by seeking contact and support from the mother (home visitor ⟶ child ⟶ mother). Additional analyses provide more support for the latter hypothesis. As evident in Figure 10 the interaction effect begins to appear at the same age (24 months) on both child and mother measures, although the differences are not significant. By 30 months, differences are significant on both measures, but when child scores are used as a covariate, maternal scores are no longer significant ($\underline{p}$ = .89), whereas when the procedure is reversed, child scores are marginally significant ($\underline{p}$ = .07). Note also that Baby Only - Mother Only comparisons failed to reveal differences in several patterns of behavior which show sex differences during this age period. Scores on factors such as Functional Social Symbolic Competence, Specific vs. Diversive Exploration, or Maternal Dominance failed to show interactive effects. Although the path is by no means clear, it is possible that the boys had established a pattern of skills and inclinations which ran counter to the Baby Only curriculum: for example, the curriculum stressed language games and pretend play, which boys develop slowly and which, in some respects, might conflict with cultural values the children are beginning to acquire. Also boys tend to prefer a specific mode of exploration--the intensive, preoccupied manipulation of a particular object, while the home visitor attempted to encourage a wider, more protean style. Again, a stylistic incompatibility between home visitor and children might have evoked sufficient distress to lead the boys to seek out the mother who, in turn, responded with heightened social behavior.

Figure 10 about here

It is noteworthy that Baby Only - Mother Only comparisons failed to reveal effects which were not linked to sex, a failure which is strikingly similar to the pattern of findings reported by Gordon & Jester (1972) in which the effectiveness of the parent educator in mother vs. child comparison treatments depended on the sex of the child.

Intervention Style: Dyadic vs. Triadic Comparisons

It became evident quite early in the home visit series that as far as home visitors were concerned the dyadic and triadic modes of interaction required different types of preparation. On the one hand, the dyadic groups meant preparing to slip into a relatively stable role relation with one other person in which the home visitor with increasing skill could predict how mother or child might respond to an overture or counter-overture. In a sense, dyadic interactions were easier to stabilize and routinize because it was possible to delete a source of uncertainty. On the other, the triadic groups meant preparing for two and possibly three, shifting roles--one with the mother, another with the child, and, inevitably, the delicate more elusive role of "expert" (with its alarming evaluative status) vis à vis the mother's behaviors with the child.

Figure 11 & Figure 12 about here

Mean change scores in maternal dominance are plotted in Figure 11 (see Appendix F, Table 7 for mean factor scores). Although maternal dominance decreases between 12 and 30 months, the dyadic groups decline somewhat more steeply than triadic groups. However, it is the pattern of change over age which differentiates the groups. Whereas mothers in the triadic groups tend to become more controlling between 12 and 18 months, mothers in dyadic groups become less controlling; dyadic mothers show a belated increase by 24 months, but then show a steeper decline between 24 and 30 months.

The cubic trend for children's test competence is also significant. Change scores plotted for dyadic and triadic groups (Figure 12) indicate some synchrony between maternal dominance and children's test competence: increases in maternal dominance tend to be accompanied by decreases in children's test competence and decreases in maternal dominance tend to be accompanied by increases in test competence. Again, there are exceptions (e.g., no change for dyadic groups between 12 and 18 months, and a decline for traidic groups between 24 and 30 months even though maternal dominance shows a small decline). Although Baby Only girls and Mother Only boys contributed substantially to the improved test performance of the dyadic groups between 24 and 30 months, sex made no differential contribution to the performance of triadic groups. Maternal dominance did not interact with sex over curriculum groups, although as reported earlier, the two-way interaction between sex and age was significant. Some comfort can be derived from the additional finding that although mothers in the triadic groups tended to be more controlling at some ages, they were also generally more articulate in their language style ($\underline{p}$ = .02, MT = .39, MD = .07).

Although the connecting links are not clear, maternal dominance may have a negative influence on children's test performance. More disconcerting from the perspective of curriculum development is that at two ages the more complex and intensive three-way interaction between home visitor, mother, and child enhanced the controlling, intrusive behaviors of the mothers, and degraded the test performance of the children.

Educational enterprises often contain hidden messages. The core curricula made explicit efforts to avert the pattern of results which appeared. The play curriculum, for example, developed the notion of an adult elaborative play style in order to avoid supporting a maternal style in which the adult dominated the child's activities. The goal was to combine awareness and appreciation with a non-intrusive style of interaction. Unfortunately, mothers may have acted upon the more obvious though unintended (and even disavowed) message that mothers ought to be more active and initiative with their children. Since the core curricula seemed to have a common effect (even though each preached a similar light-touch-responsive message), one might conclude that regardless of the cast, curriculum materials were not sufficient to deal with the ramifications of a participant-expert. How the home visitors produced the effect is unclear. Whether the mothers became anxious regarding their child's achievement, whether they found it more comfortable to be active when they were being observed by an expert, or whether the mothers' heightened activity was inadvertantly reinforced by the home visitors (e.g., home visitors were careful not to criticize the mothers' behavior, and the rule 'be positive' may have been difficult to apply selectively), are alternative possibilities for future research to examine.

The Lonely Mother: Home Visit vs. Test Only

Approximately 5% of the mothers in the study reported that they had no family living in the area, but on a given week, many more reported that they and the baby neither visited nor were visited by friends (30%) or relatives (23%). The sample also contained families on the other extreme: 10% reported 50 or more relatives living in the immediate area and many reported busy social calendars--5 or more visits with different relatives (16%) or different friends (13%). The median family had 15 relatives in the area, saw at least 2 of them during an average week. During the course of the project, we were frequently startled by the complex social interconnections among families and friends in an area of over 300,000 people. It was not unusual to learn that a mother's relative's child had participated in an infant study a number of years ago; in one case, two mothers who went to school together met again for the first time in 10 years at a party sponsored by the social curriculum; in another, more dramatic incident, the connection between two families participating in the study were discovered when the newspapers announced that the fathers had been indicted for the same crime.

Although those mothers who were socially isolated were extremely so, most of our families had at least some contact with family or friends outside the home. The demographic data, therefore, did not suggest that the contrast between home-visited and Test Only groups would reveal patterns of maternal or child behavior clearly linked to a reduction of social isolation such as enhanced sociability in the mothers or friendliness toward strangers or exploratory behavior in the children. Rather, the comparison between home-visited and Test Only groups yielded some evidence that one consequence of regular home visits might be a heightened centering of attention upon the child indexed by increased maternal controlling behaviors. As indicated in Figure 13 , between

12 and 24 months, home-visited mothers as a group tended to use a language style which stressed directives rather than questions, i.e., they less frequently consulted the child when interacting with him, they offered fewer choices, they were more prone to guide rather than to evoke behavior. Note, however, that by 30 months, the direction of the differences is reversed. The decline for Test Only mothers in this style of verbal interaction stops at 24 months, whereas mothers in the home-visited groups continue to become relatively more active participants in their children's play, accompanying their activities with a heavy dose of verbal reinforcement (at a level similar to that shown by play mothers).

Figure 13 about here

The differences between Home Visit and Test Only groups appear in fairly subtle aspects of maternal interactive style; never in an aspect of the children's behavior. The maternal factors which are sensitive to the Home Visit vs. Test Only contrast may be small indications of the mothers' heightened attention to their children, perhaps a heightened concern with their children's achievement, promoted by the presence in the home of an interested, child-focused third person. The notion that any kind of interest or caring might have pervasive influence on mothers and children was not supported. The social isolation of parent and young children might be a major issue in some ethnic or socio-economic groups and, perhaps, for some of our families, but neither demographic nor outcome data suggested that the issue was generally important to the predominantly Italian, Roman Catholic, middle class population who participated in the present study.

Discussion: Stability and Change

One justification for beginning a parent education program when the children are 12 months old rather than later or earlier is that during the following year-and-a-half children make breathtaking strides in the acquisition of symbolic-representational functions, in their mastery of language, in their organization of material objects, and their interpersonal exchanges with other people. It seems reasonable to assume that an intervention geared to the beginnings of a developmental period, before new behavioral organizations have appeared, might demonstrate selective effects on some components of development rather than others.

In some respects, the distinctiveness of children's language, play and social behavior is more apparent than real. Factor analysis revealed that some components of language, play and social behavior shared a common developmental course over the year-and-a-half period. When children's behavior is assessed in relatively open-ended, ongoing situations--when playing with toys, talking with the mother, or when behavior is observed "naturalistically" in the home--there are elements of speech, object manipulations and social behavior with an unfamiliar observer which display sufficiently similar relations with age, sex, and curriculum to form a coherent pattern. That the pattern of behavior we have labelled "Functional Social-Symbolic Competence," reflects structural changes between 1 and 2 years of age is suggested first, by the elements of behavior which appear in the factor, and second, by the way in which the language, play and social curricula influenced children's development. Curriculum effects appeared between 12 and 24 months, during the period of most rapid growth, and the most effective curriculum was language, followed by play, followed by social. It is likely, however, that the effect was produced by the combination of curriculum and home visitor. When visits tapered off to a monthly schedule, the precocious performance of language and play children abated, the slower developing social children continued to advance, and terminal levels of performance at 30 months no longer differentiated the groups. The mothers also responded differentially to the curricula, and again, the order of influence was language, play and social. However, maternal differences, in a pattern of behavior which conceptually should be most closely linked to children's symbolic-cognitive development (e.g., the use of complete sentences, descriptive language, a non-directive, non-intrusive interactive style), do not make their appearance until 30 months--6 months after differences appear in the children and immediately after home visits have terminated. If a chain of influence can be inferred from these findings, the most reasonable would be home visitor → child → mother rather than the home visitor → mother → child chain expected from a linear parent education model. More importantly, whatever the linkages, curriculum changes brought about in the structural aspects of children's behavior seem to be ephemeral and unstable; apparently, structural precocity requires the intensive buttressing of a skilled and well trained professional. It is as if the children acquired merely the surface manifestations of maturity which did not become an integral part of their underlying competence. We are not suggesting that language and play children showed a structural regression (our measures are not based on the presence or absence of forms), but, rather, that their tendency to spontaneously use advanced forms was reduced in the absence of appropriate encouragement.

An additional finding suggests a second principle which adds unwanted complexity to our analysis. Although structural differences produced by the core curricula became attenuated by 30 months, differences in the child's interest in maintaining an interpersonal exchange with the mother at 30 months conforms to the ordering of curriculum groups (language, play and social) which appeared earlier in the child's social-symbolic competence. If early precocity is difficult to maintain, it may, nonetheless, have pervasive consequences for how a child uses those skills which have become structurally integrated. The child who is advanced

Many staff meetings were spent discussing the ethical problems posed by home visitors who, in varying degree, were concerned about sex stereotyping in American society. It soon became evident that many of our families were deeply committed to the preservation of sex-differentiated roles; in more than one family, the home visitor was asked not to bring dolls for boys, and in other families, the mothers quietly put the dolls away between visits (explaining that the father couldn't bear to see his son playing with them). As a project, we were determined not to impose a counter-culture upon our families, and by policy we acquiesced passively to parental wishes -- with two exceptions, the Social and Mother Only curricula. In these curricula, the question of sex-stereotyping was introduced as a discussion probe (How do the parents feel about sex-typing? Are social values changing? Are tomboys punished as much as sissies?). It is thus striking that a modification of the direction of sex differences appeared only in the Mother Only group in comparison with the Baby Only group, and that the modification appeared as a reversal. Within the Baby Only - Mother Only contrast a rather special set of conditions were associated with changes in children's test competence. Typically, early maternal sociability and positive social exchanges between mother and child seems to generalize to strangers and supports the child's ability to function in a test situation (see next section for additional evidence). The significance of these behaviors appears to have been altered in the Baby Only - Mother Only groups -- as if in the former, the home visitor, herself, became a social mediator for the child (positive for girls and slightly negative for boys), whereas in the Mother Only group, it was the mother who promoted a similar transition for boys while maintaining a restrictive sociability toward the girls. Baby Only mothers, although not targets of the intervention, show increased sociability toward their boys, promoted by the children's enhanced at an early age is able to do more than his less advanced peers and in doing more has more opportunities to experience the impact of cognitive, verbal and social skills on his immediate environment; if he is advanced in language he might discover that verbal discourse is pleasurable, and that adults respond warmly and with interest to children who talk; or, he might discover more broadly that the domain of language serves an important social function which permits sharing, information seeking, and information giving. If, at the same time, the child at an early age has invented intricate ways of combining objects, how to impose order and relations on discrete events, how to transform familiar experiences into make-believe games, he may benefit from a social by-product whereby such skills support extended, mutual exchanges with others. It may be that in order to understand change between 12 and 30 months we must envision the child in an expanding behavioral environment criss-crossed by a regulating feedback system — the child whose behavior is enriched and broadened, becomes a more appealing and interesting child to be with, and for that child, the significance and meaning of social exchanges undergoes substantial changes which persist although at a later age his performance no longer distinguishes him from his peers. The mother then actively acknowledges the child's sophistication (i.e., the socialization of his competence) with more complex language and a greater willingness to permit the child to control his own behavior.

Another finding of considerable interest concerns the home visit conditions which modify the sex differences found among children who participated in the present study. The generalization that girls are superior test takers than boys (i.e., they receive higher scores on standardized tests, and show more of the social behavior which is appropriate in a testing situation) is qualified by the behavior of boys and girls in the Mother Only group. Here, in the only condition in which the home visitor did not interact with the children, the direction of the difference is reversed by 30 months of age.

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orientation to the mother. The argument that Baby Only children modified the behavior of their mothers is consistent with the nature of the treatment and the direction of the evidence.

The best candidate for a tentative example of an intervention procedure which influenced maternal behavior which may have in turn influenced the child appeared when triadic groups were compared with dyadic groups. Maternal dominance seemed to be associated with decrements in test performance, and mothers in triadic groups tended to be more controlling than mothers in dyadic groups. Given the volatile, even explosive quality of children's behavior at these ages, it should not surprise us to find marked reactions to changes in maternal attempts to exert control. The findings are suggestive and merit further study.

In sum, although 9 of the 14 mother and child factors revealed significant curriculum effects, the connections between maternal and child behaviors were not always straightforward, and not always an obvious outcome of the effort to modify children's behavior by modifying the behavior of the mother. In the following section we examine a few of the linkages between maternal and child behaviors which in some cases governed outcome measures in spite of intervention procedures and, in other cases, help to interpret curriculum effects.

CHAPTER V WHEN THINGS DON'T CHANGE

Causal Hypotheses

The planning and implementation of an intervention program is often a myopic affair; energies are so funneled into an insistence upon radical change that it is difficult to fully appreciate the essential conservatism of the family and relationships among family members. More or less humbly, an educational program -- even at 12 months of age -- imposes itself on an existing and non-trivial matrix of sensitivity and understanding between parent and child. Already in existence, developed gradually over the preceding year, is a system of family accommodations which takes into account personal histories, skills, inclinations and societal exigenecies. As described in the previous section, features of a home-based program can modify the behaviors of mothers and children. It is clear, however, that some aspects of behavior are more modificable at some ages than others, some are slow to change, whereas others resist change at all ages.

From either a developmental or a sociological perspective, such conclusions are not surprising. The behavior of human beings is robustly organized, and new experiences are appraised and assimilated according to available and functioning structures. Informal observation supported by the data analyzed thus far lead us to believe that major sources of influence on the behavior of children and mothers were already operating when the program began, and that although we may have dented, deflected, or temporarily suspended some, others continued to prevail. In the previous section we assessed what changed; here we turn our attention to what stayed the same. In the following analyses, we use cross-lagged correlational analyses (Campbell, 1963) to examine how sets of governing relations eluded our intervention efforts.[1]

Recall that the design of the social curriculum was motivated by earlier findings which indicated that maternal sensitivity and responsiveness had a major influence on children's development between 11 and 17 months (Clarke-Stewart, 1973). The mother factor, Maternal Sociability, contained several of the particular behaviors which were implicated in those earlier findings. Unfortunately, the social curriculum failed to modify maternal sociability; the other core curricula did no better, and the only relation between maternal sociability and treatment, which appeared at 30 months, involved sex.

The question of interest, the is whether this aspect of maternal behavior exerted an influence of children's performance while the program was in progress. The pattern of 12 and 24 month correlations for the relation between Maternal Sociability and Children's Test Competence[2] is diagramed in Figure 14. The correlations on the diagonals are cross-lagged correlations. The cross-lagged correlation between maternal sociability at 12 months and children's test competence at 24 months is significant, whereas the cross-lagged correlation on the other diagonal is not. The difference between the two cross-lagged correlations is significant ($\underline{z} = 2.41$, $\underline{p} < .025$), supporting the hypothesis that maternal sociability influenced the children's later test competence. This causal hypothesis is diagramed in Figure 14a. However, certain rival hypotheses, diagramed in Figure 14b to 14c are consistent with this difference. Procedures for eliminating alternative rival hypotheses are described in considerable detail elsewhere (Rozelle & Campbell, 1969; Eron, Huizman, Lekfowitz, & Walder, 1972;

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[1] Analyses were performed on the within-cell correlations of mother and child factors which at a given age level did not reveal significant main effects of interactions for any treatment contrast. To simplify the analysis, scores for the entire group of 100 were used.

[2] Since the Baby Only - Mother Only interaction with sex was not significant at 24 months, and the difference between dyadic and triadic groups was not significant until 30 months, scores were collapsed over treatment groups.

Clarke-Stewart, 1973). For example, the hypothesis diagramed in Figure 14b, is that maternal sociability at 12 months affects the child's test competence at 12 months, which leads to test competence at 24 months. This hypothesis can be rejected because if it had been true, the correlation between the end points (.34) would have been less than the product of the correlations between intermediate points (.01). The hypothesis diagramed in Figure 14c was eliminated on similar grounds.

Figure 14 about here

Procedures suggested by Eron et al. (1972) and Rozelle and Campbell (1969) were used to examine the hypotheses depicted in Figures 14d and 14e. The possibility that the relation between early maternal sociability and later test competence could be explained as a function of early test taking ability (Figure 14e) can be rejected because the partial correlation between early maternal sociability and later test competence, controlling for early test competence was as high (.36) as the unpartialled correlations (.35). The final possibility, that early test competence reduced maternal sociability, tested by using a "no cause baseline" (.02) which corrects for a change in the internal reliability of the measure, failed to eliminate the significant cross-lag correlation between maternal sociability at 12 months and the child's test taking ability at 24 months (see Appendix F, Table 8 for additional details). Since it was possible to eliminate plausible competing hypotheses, there are grounds for believing that maternal sociability at 12 months contributed to children test performance at 24 months.

Consider another child factor which responded differentially to the core curricula at some ages and not others. Although children's social-symbolic abilities were differentailly modified by the core curricula at 18 and 24 months, differences were no longer significant by 30 months. Of interest here is whether there are early maternal behaviors which can be shown to "cause" children's competence at 30 months. According to the data given in Table 19, the mother's tendency to be passively-responsive to her child at 12 months had a negative influence on the child's competence at 30 months. Note also the high negative correlation between maternal and child behaviors at 12 months. At 12 months, children who were relatively immature had mothers who tended not to initiate activity with them although they responded to the children's verbal efforts. But, since the children made few attempts to speak, the mothers had few opportunities to respond. Controlling for child scores at 12 months does not reduce the cross-lagged correlation; as indicated in Table 19, other plausible hypotheses can be eliminated. A passive maternal style at 12 months seems to provide too few inducements or opportunities for the immature child to acquire advanced forms. Although children acquire most of these forms by 30 months, some do better than others. How well children have mastered sophisticated forms of language and play by 30 months is apparently a function of the mother's initiatives at 12 months.

Table 19 about here

The language curriculum was also based on findings from a preliminary study. In designing curriculum materials, it was reasoned that the pre-verbal child offers little comprehensible language for an adult to expand, acknowledge, or reinforce. Furthermore, many parents find it difficult to speak to a child who is not speaking and, when speaking, to use language within the child's span of comprehension, although the modeling of appropriate language facilitates children's development. The language curriculum encouraged the mother to speak to the child about his immediate activity and interests, rather than just respond to the language he produced. Apparently, the curriculum came upon the scene too late with too little. In the hands of the home visitor, the strategy worked well enough to produce a transient effect. However, the mother's way of interacting with the child at 12 months (or earlier) is more crucial than we had supposed; the mother's style at that time has consequences which persist for the sample across a year-and-a-half period despite curriculum induced changes in the children along the way.

Both in the case of the social curriculum and the language curriculum, strategies were based on prior evidence of a linkage between early maternal behaviors and later child abilities. The linkages appeared at 12 months of age, and, at the time, it seemed reasonable to assume that 12 months would be an appropriate age at which to attempt to modify those maternal behaviors which seem to have negative consequences for some children. In retrospect, the assumption no longer seems reasonable. Maternal behaviors and the child's response to those behaviors probably come into being and have been functioning long before the age at which causal influences can be demonstrated. If those behavioral adaptations are to change, the impetus for change may have to be introduced before the system has been so well established that relatively long-term consequences can be demonstrated. Key maternal behaviors were highly intervention-resistant, whereas child behaviors seemed more modifiable, at least for short periods of time. The influence of early maternal sociability on children's test taking ability held until at least 24 months, whereas the influence of an early maternal language style spanned intervening curriculum effects and appeared at 30 months.

The synchronizing of mother change and child change is a central problem for parent education programs to ponder. For example, maternal sociability might have to change by 10 months of age if the child is to have the kind of relation with his mother by 12 months which will enhance his performance at 24 months. It is also possible that belated sociability might have a negative influence on test performance (e.g., Baby Only boys at 30 months) so that the developmental timing of maternal behaviors, especially those which decrease with age, may determine whether they have positive or negative effects.

Additional analyses revealed other problems. As we reported in an earlier section, sex differences appeared in the two child factors we have been discussing. Do the relations, between maternal and child behaviors hold equally well for both sexes? Separate analyses for boys and girls suggest that they do not. Although the pattern of relations is similar for both sexes, it is evident that the relation between early maternal behaviors and later child performance is stronger for girls than boys.

Other sex differences discussed previously concerned maternal dominance and children's specific-diversive exploration. At 12 months, mothers were more controlling with their girls, but by 24 months they were more controlling with their boys. Girls tended to exhibit a diversive style of exploration whereas boys favored a more single-minded specific style. Cross-lagged correlational analyses, performed separately for boys and girls, revealed a highly significant relation between maternal and child behaviors for boys but not for girls (Table 20). When boys' mothers are highly controlling at 12 months, their sons exhibit a diversive style of exploration at 24 months. In other words, relative to girls, the mothers of boys tend to be less controlling at 12 months; for boys, less controlling maternal behavior supports a specific style of exploration. When mothers treat boys in a manner similar to the way they treat girls, boys tend to exhibit the diversive style favored by girls. It should be noted that maternal dominance showed no differential intervention effects for sex. Evidently, it is another example of an intervention-resistant pattern of maternal behavior which is operating in sufficient strength by 12 months to influence children's behavior a year later.

Table 20 about here

Contemporaneous correlations at each age level, for the total group and separately for boys and girls are listed in Appendix F (Tables 9 to 15). The correlations are useful in that they indicate relations within and between child and maternal variables. At 12 months for the group as a whole Bayley (Appendix F, Table 9) test scores are positively correlated with the mother's use of an elaborative play style (.31), and with a specific mode of exploratory behavior (.26). The first relation is significant for girls (.41), but not for boys, whereas the second is significant for boys (.42), and not for girls. An elaborative play style also correlates positively with sustained problem solving activities for the total group (.41), for boys (.44) and for girls (.38). However, for boys an elaborative style of play is negatively associated with functional-social symbolic competence, and positively associated with a specific style of exploratory behavior. In other words, for boys at 12 months there is a significant connection between maternal play style and exploratory behavior, and between exploratory behavior and test scores. Not surprisingly, at an age when test items tend to reflect sensory motor skills, test performance is linked to a specific style of exploratory play which in turn is associated with an unobtrusive, but sensitive style of maternal participation.

By 30 months, the pattern of correlations has changed (Appendix F, Table 10). For the group as a whole, the relations between maternal play style, exploratory behavior and test scores is no longer significant. Now, Binet scores are positively associated with the child's tendency to spontaneously engage in sustained problem solving activity and the mother's use of a passive but responsive style of interaction. However, both play factors are negatively associated with functional social-symbolic competence; that is, the children who exhibit a high level of structural competence, tend to be those who are more diversive, more social in their orientation. Furthermore, the pattern of correlations is similar for boys and girls (Appendix F, Table 14). It is as if by 30 months, maternal and child behavior has become reorganized –– with the child's capacity to engage in sustained problem solving activity replacing the importance of earlier sensory motor object exploration, and the mother's verbal responsiveness replacing the importance of her earlier non-verbal object oriented elaborations.

The purpose of the present section was not to discourage serious effort to enrich the lives of parents of children. Rather, the analyses were undertaken to encourage a more realistic appraisal of the boundary constraints which the ongoing, functioning context of the home and family sets upon intervention efforts. The preceding analyses dwelt on the consequences of relations which were functioning at 12 months of age — before the educational program began. One conclusion is that it might be exceedingly difficult at that point to alter the course of an already functioning system -- either a stronger intervention is required or one which begins earlier. We should note here that those 12 month maternal factors which showed significant causal relations with child factors were used as covariates to examine whether they either enhanced or masked program effects. Apparently, they did not do so; the program effects reported in the previous section were independent of early maternal behaviors.

Demographic Characteristics

If a relatively molecular behavioral analysis reveals significant relations, one might wonder whether there might be more molar social or ecological characteristics of families and parents which warrant consideration.

In our initial interview with the mother, we inquired about the parents' education and occupation, their contact with relatives and friends, the size of the household, whether the mother sought advice in child rearing from friends, relatives or professionals, and other itmes which might tell us about the life style of families in the study (see Appendix A for individual items and data reduction procedures). In addition, the mothers were given the Peabody Picture Vocabulary Test (PPVT) and the Wechsler Adult Intelligence Scale (WAIS, see Appendix A, Table 4 for intercorrelations).

Family background, demographic and IQ data were combined by factor analysis into two scales which seemed to reflect the structure of family life for the parents and children who participated in our study (see Table 21 for a summary of family structure factors and Appendix A, Table 5 for intercorrelations). The first factor seems to represent the contrast between families who maintain extensive and close contacts with members of a large and local family network and those whose family connections are relatively limited. Families who score high on the family network factor tend to utilize their families as a source of social support; they have more education, a higher occupational status, and the mothers score higher on the tests of verbal and non-verbal intelligence. For the sample of families in the present study (which did not include the wealthy or well-educated), a strong family support system is associated with relatively higher levels of educational and economic achievement.

Table 21 about here

The second factor seems to represent a different dimension of family structure, namely the organization of the household. Families who receive high scores tend to have large households, many individuals in addition to the mother care for the child and the father seldom participates. Although many relatives live in the area, the household is a relatively self-contained social unit. These families tend to have a lower occupational status and less education.

The reader must bear in mind that these patterns of family life style might be particular to the small New England city in which our families lived. Our families were predominantly Roman Catholic and ethnically Italian-American. The median family could count 15 relatives living in the immediate area, and 84% counted 4 or more. The larger households generally contained a sibling, one or two grandparents and occasionally an aunt or uncle. Our families tended to be relatively long term residents of the community; for the mothers, the median length of residence was 10.5 years, 58% had lived in the area 16 or more years, and 87% expected to be in the area in 5 years. Only 22% of the mothers and 39% of the fathers belong to a club or other organization. Although relatively stable residents of the area, 30% moved within the area during the year-and-a-half period; 21% of the fathers changed jobs, 5% lost jobs, and 21% of the mothers went to work, leaving their children for the most part in the care of relatives (see Appendix A, Table 3 for additional information). Although families in the study seemed to be representative of those in the community with comparable occupational and educational backgrounds, (see Appendix A, Table 1), there is no reason to assume that they are similar to other families in cities of similar size or geographic location.

For our sample, family ecoloy is associated with the behaviors of mothers and children. Intercorrelations with several behavioral measures which do not show intervention effects are displayed in Table 22. One child factor -- sustained problem solving -- which neither responded to the intervention nor revealed causal relations with early maternal behaviors shows significant relations with family structure at 12 and 18 months. Children who came from high SES families with an extended network of close family relations, are more likely to show sustained problem solving activity, which reflects an achievement-oriented style of problem solving characterized by persistence despite frustration. Children from these families do well on standardized intelligence tests beginning at 18 months, and show a high level of test taking skill at 24 months.

Table 22 about here

Note the pattern of relationships between family structure and maternal passivity. At 12 months, low SES mothers who come from a restricted family network are likely to be passive when they interact with their children - the age at which maternal passivity is associated with later decrements in social symbolic functioning. However, at 30 months these mothers become highly active and non-responsive, whereas the more capable mothers from a supportive family network become relatively less so. According to the interpretation we

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[1] Over the period of the study, the unemployment rate in the state increased by approximately 5%.

proposed earlier, the child requires a more assertive, more actively modeling mother at 12 months (before he has acquired functional language and symbolic skills) than he does at 30 months (when he is technically able to engage in extended discourse).

Household organization also shows linkgages with maternal behaviors -- far more so than with child behaviors. Live in a large household tends to support a less passive maternal style of interaction with the child at all age levels -- perhaps a maternal consequence of multiple caregiving. The mothers' tendency to use an elaborative play style -- an intervention resistant maternal behavior -- also shows a small but significant relation to the way a household is organized: it is mothers from relatively nuclear, high SES households who are more likely to use such a style when playing with their children.

The data seem to hold two messages. First, some of the behaviors we set out to change seem to be deeply rooted in a larger matrix of family culture -- family values, predispositions, and preference -- which resists minor perturbations and also, perhaps, checks the deviation of its members from firmly established, normative family modes.

The second message is more in the form of a perturbing and perennial question: to what extent was our definition of central variables determined by unsupported social class and professional biases? To illustrate, the play curriculum stressed the importance of a maternal style of play which is attuned to the child's behavior, which elaborates the child's interests rather than imposing the mother's will. Yet the mothers' style of play did not respond to curriculum attempts to change it. At the same time, it was the style favored by our more middle class, nuclear families. Is there any evidence that our selection and definition of this variable was more than a product of our own social class biases.

Table 23 about here

The correlational data displayed in Table 23 lend some support to our choice. At 12 months maternal play style and children's test scores are significantly correlated. Moreover, the 12 x 18 and 12 x 24 month cells reveal a cross-lag pattern which suggests that maternal play style at 12 months "caused" a higher level of children's test performance[1] at the later ages. Note, however, that the causal relation holds more strongly for boys than girls; thus it is especially boys who benefit from the maternal style, and it is boys from middle class, family oriented homes who are most likely to have mothers who favor such a style. In some fashion, then, another aspect of maternal behavior which may play an important role in children's later behavior, is associated with an ecological aspect of family organization.

The skein of connections is obviously a knotty one. In two cases in which we find evidence that maternal behaviors might have a causal influence on later child behaviors, we also find evidence that, even within the narrow demographic range of families sampled in our study, these important maternal behaviors are associated with the broader social context of people's lives. So we return to the theme with which we introduced this issue. But now consider that theme in a larger theoretical perspective. If we truly conceive of human beings as functioning within highly organized systems, and if we conceive of systems as themselves organized hierarchically, with sub-ordinate smaller systems nested within larger societal systems, what might be some minimum conditions for permanent, stable, behavioral change? The question is far easier to pose than answer. If we are asking the "right" question itmay, however, be possible to offer some tentative hypotheses for the future. In the previous discussion we examined associations between family characteristics and the behaviors of

linkages revealed by our analyses, we are forced to ask whether the effects of home-based education on mother and child were modified by characteristics of the larger system of which they are a part.

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[1] A similar pattern appeared for the children's test competence factor, but the cross-lags did not differ significantly.

Family Structure and Program Effects

The import of the foregoing discussion is that the life styles of our families provided the children with varying degrees and kinds of opportunities for sustained and enduring social contacts beyond those provided by the parents. In a sense, the behaviors of mothers and children were linked to a system of relationships which extended beyond the dyad, and which might serve to transmit and maintain culturally valued ways of rearing children. It should be noted and emphasized that our analyses did not reveal a dichotomy between relative-centered and friend-centered networks; if our families were not immersed in kin, parents and children had relatively restricted and casual social ties. At least for the families who participated in our study, the community and the neighborhood provided few opportunities for the formation of close and viable personal ties.

However, there were two distinctive patterns of family engagement: one which involved the amount of contact between independently maintained households (Factor 1) and another which involved contacts within a nuclear or extended household (Factor 2).

If these patterns of family organization do, in fact, bring stability into people's lives. if they serve to buffer individuals from the vagaries and dangers of depersonalized communities, it seems reasonable to expect that family organization would play a role in the workings of a home-based education program, especially when the program is deeply concerned with maternal influences of children's behavior. For example, according to the mother's report, families who score high on Factor 1, turn to their relatives for child care information, rather than to friends, neighbors or professionals. Under ordinary circumstances, pediatricians, educators, ministers and the media are notably ignored as sources of information about the care and rearing of children by the middle and lower class parents who participated in our study. How receptive then, were our families to expert opinion delivered in their homes?

Consider another issue. Families who score high on Factor 2 have extended households in which the young child has multiple caregivers. In these households, the mother is not necessarily the child's primary caregiver. She shares the task with others who may have a vested interest in how the child is treated. To what extent, then, is maternal change facilitated or impeded by the sharing of child-care responsibilities?

In order to examine these issues with regard to particular aspects of home-based education, we divided our families into high and low groups according to their scores on family network and household organization. Multivariate analyses which contrasted curriculum groups were then performed on trends as described earlier.

Family network: Extended-restricted. Whether the families were part of an extended family network played an important role in the extent to which maternal behavior was influenced by a home visitor. However, the extent and direction of the effect depended on the treatment group and the age of the child. Change scores are plotted in Figures 15, 16, and 17 (see Appendix F, Tables 15 to 19 for mean scores).

Figure 15 about here

During the first six months of the program, the language curriculum enhanced the elaborative style of mothers in high SES extended network families, the play curriculum enhanced the elaborativeness of mothers in low SES, restricted families, and the social curriculum had no effect whatsoever (Figure 15). The play curriculum was able to maintain this maternal play style over the year and a half period, whereas differences in other groups were no longer significant by 30 months. Mothers from both types of families showed gains at 30 months if they participated in the play or language curriculum. Social mutuality is another factor which interacts with core curriculum and age (Figure 15). But here, the benefits accrued to mothers high on Factor 1, and the most effective curriculum by 30 months was the social curriculum. For mothers low on Factor 1, the language curriculum worked best, but only at 24 months. Roughly paralleling changes in the mutuality of the mother-child relation, were changes in the child's social preference for the mother.

Again, the curricula promoted sociability toward the mother for those children who already had high levels of stimulation from members of their family, and who had mothers who engaged them in extended interactive sequences. By 30 months, the social curriculum was most effective for high Factor 1 families, whereas the play curriculum was most effective for children from low Factor 1 families.

Figure 16 about here

The extent to which mothers use a passive-responsive style when interacting with their children was also sensitive to the characteristics of the families (see Figure 16), but here, again, if a passive-responsive style supports children's development at the older ages, it is the higher socio-economic, family-oriented mothers, who show the greatest, overall increments by 30 months regardless of treatment group. However, the mere presence of the home visitor (HV vs. TO contrast) supported this style for low Factor 1 mothers, and the Mothers Only group produced the highest 30 month scores. The course of change over the year and a half period differed according to treatment group, but in comparisons which yielded a significant interaction, all mothers became more assertive by 24 months, whereas the tendency to become more assertive at 18 months was cushioned for high Factor 1 mothers in the Mother Only group, and for those who were participating in the home visiting program.

Figure 17 about here

Finally, ecological aspects of family life were associated with maternal dominance in the comparison of triadic and dyadic home-visit groups. In earlier analyses we reported that at 18 and 30 months mothers in triadic curriculum groups become relatively more controlling and intrusive toward their children than mothers in dyadic groups. It is apparent from Figure 17 that high Factor 1 mothers were largely responsible for this difference: at all ages, the effect of the core curricula upon these mothers was to enhance their directiveness and intrusiveness.

Not surprisingly, family ecology was more likely to produce curriculum interactions on maternal variables than on child variables. Apparently, the organization of family life plays an important role in determining maternal behaviors and their responsiveness to change agents outside the family milieu. However, our notion that a strong family culture would work against change is clearly not supported by our findings. In our initial formulation of this possibility, we concentrated on the social organization of the family, neglecting its intellectual and economic functions. Although our high Factor 1 mothers were more family-oriented, they were also better educated, and were of relatively higher economic status. For such mothers, it may be that the family network supports upward mobility and any change that promises to enhance the social standing of the family. Our families were not, for example, insensitive to the fact that our project originated at Yale University. One of the standing jests, which took many forms and which was made by too many mothers to be casually dismissed, was that now they could say that their one-year-old was "going to Yale," or "had attended the Yale prep. school." It was the mothers who led more restricted lives, with fewer educational and economic opportunities, who were most resistant to change -- at least with the relatively limited methods and procedures at our disposal. But it is necessary to bear in mind that our more advantaged families came from the middle of the educational and economic spectrum. None of the mothers had attended college, and post-high school education consisted of vocational training. Although our parents aspired toward greater affluence, and envisioned wealth and success for their children, they themselves led humble, hard-working lives in fairly routine civil service or skilled trade occupations. Our more isolated, lower class families represented the working poor; they were often not high school graduates, and their jobs were often as manual laborers with little hope for advancement.

Household organization: Expanded-nuclear. A second set of analyses were performed for families divided into high and low groups on Factor 2 which reflects the organization of the household. Families in the high Factor 2 group had large households, multiple caregivers for the children, little father participation, low educational attainment, and low status employment. Although many relatives lived in the area, the household represented a self-contained social group. Families in the low Factor 1 group had smaller households, more father participation and higher social class status. The results are plotted for change scores in Figure 18.

Figure 18 about here

Again, contrary to our initial speculation, the combination of an enlarged household and poverty facilitated maternal change, but did so differentially for curriculum groups. Mothers from expanded households showed the most change in elaborative play over pretest scores during the first six months of the language curriculum, and over the second and third six months of the play curriculum. The social curriculum had a slow start, but by 30 months the mothers who participated in this group had developed the highest level of elaborative play shown by any groups at that age. Furthermore, simply being a part of a home visit routine seemed to support a more elaborative form of play -- as if mothers welcomed an extra-household source of stimulation, no matter what its form. Household organization also produced an interaction with age in children's test competence in the Mother Only - Baby Only contrast. Here, however, the effect was strongest during the first six months, and by 30 months, household organization no longer made a difference although children in the Baby Only group performed better than children in the Mother Only group. Although the interactive effect was not sustained, it is worth noting -- in the Baby Only group, a large household initially had a negative effect, whereas children from small nuclear families showed positive gains. The pattern was reversed in the Mother Only groups. When the home visitor functioned as the mother's friend, children from large households showed performance gains whereas those from nuclear families showed decrements. It may be that the level of activity in a large housheold simply does not permit a sustained one-one relation between the child and an occasional visitor to the home. For the young child, the arrangement might be puzzling and confusing. Since within the home there are different people who regularly care for him and he rarely experiences care from baby sitters or non-household relatives, the role and function of the home visitor might be difficult to understand. However, with age the arrangement seems to get easier, and by 30 months the child performs well.

The pattern of results suggests the need to re-examine our earlier hypotheses about the relation between family organization and resistance to change. We initially conceived of family culture as a conservative force. When the data indicated that people who belong to an extensive family network were more open to change, we argued that socio-economic factors were more important than family factors and were responsible for the results. However, we may have rejected the influence of the family prematurely. Here, on the dimension of household organization, we find low socio-economic status associated with an openness to change. Evidently, neither poverty nor affluence are necessarily linked to a person's responsiveness to educational efforts. The results argue for a revised notion of how families contribute to human growth and development. Over two dimensions of family life style, the element associated with resistance to change was the relative isolation of the mother-child dyad. Regardless of economic or education advantage, family involvement, whether within or without the immediate household, seemed to support the tendency to be open to new ideas. Our data suggests, tentatively to be sure, that "family" when visible and viable provides a secure and stable framework which makes it easier to welcome and utilize new information from persona who are outside the family constellation.

Continuity and change: Summary and conclusions. In the foregoing section we considered three issues: 1) the existing and ongoing relations between mother and child which are operating when a parent education program begins, 2) the ecological characteristics of family life associated with patterns of maternal and child behavior, and 3) those aspects of family organization which facilitate or impede change induced by a parent education program.

With respect to the first, it is evident that by 12 months of age, mother and child have developed a mode of interaction which will influence the child's later behavior. At least one form of maternal behavior (maternal sociability) which has subsequent consequences was relatively immune to change, even when family characteristics were taken into account. Although the force upon the child of early maternal sociability was eventually countered by intervention efforts (i.e., the dyadic treatment groups), it took a year and a half before intervention effects became evident. The frequent finding in parent education studies (cf. Lasater, et al., 1975; Weiner, et al., 1975) that the effects of parent education efforts in infancy do not become evident until well past the infancy period may reflect the extreme difficulty of changing the social-emotional "soul" of the mother-infant relation once it has been established. It may be far easier to modify maternal behaviors which arise and develop later in response to post-infancy changes in the child's verbal and intellectual powers (e.g., the mother's articulate, nondirectiveness). We are suggesting that, perhaps, each developmental period carries with it its own set of determining influences, and that the challenge for intervention program is to discover those relations which short-circuit the power of earlier determinants.

Secondly, it is amply evident that educational designs, especially those which consider the parent as a primary agent of the child's socialization and intellectual development, must take into account more seriously than they have in the past, the function of the family system as a supporter of continuity and change. The ecology of family life -- its style and organization -- provides parents and children with more or less stimulation, more or less comfort, more or less opportunity for sustained and enduring relations. The child's experiencing of the world, the significant others in his life and their mode of dealing with him, provides and structures those special events which, for the child, constitute units of experience. The "field of events" we posited earlier is more than a figure of speech -- it is the moment-to-moment, day-to-day, mundane stuff from which the child constructs a comprehensible and workable world; it is the stuff which maintains that construction or causes it to change.

Moreover, the presence of firm and viable family connections may support human growth and development in adulthood as well as in childhood. At least among our families, the lack of family ties was not compensated for by friends and neighbors. We found little evidence that the community offered small, isolated family units alternative institution which might fulfill a similar function. It is also evident, that a simple and non-institutional program such as the one we offered did not supply a useful, supportive alternative. Indeed it was a matter of program policy to avoid as assiduously as possible any promise of institutional permanence. So, if some of our families needed to find a stable network of enduring, personal ties, if such a network ameliorates withdrawal and insularity, and if amelioration of such a sort is a prerequisite to change, future programs need to be conceived on a far grander scale than ours. "Hard to reach" families may be hard to reach even when they are ostensibly program participants, even when they welcome an outsider into their homes, and even when they continue to do so for a relatively long period of time. Accessibility is a dimension of psychological functioning about which we know little, except, perhaps that it may require fairly diverse and continuing human relationships, a social milieu rather than a social contact.

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TABLE 1

Age Changes in Selected Linguistic Variables

Variable	Age in Months 12	18	24	30	F Ratio
Proportion of Words	.05	.36	1.50	2.27	510.56***
% Referential Speech	.04	.11	.31	.33	100.92***
% Conversational Speech	.02	.10	.31	.23	149.56***
Comprehension Test Score			13.7	20.7	25.62***
% Maternal Description	.29	.33	.35	.41	18.65***
% Complete Sentences	.18	.21	.40	.48	72.45***
% Questions	.17	.18	.24	.28	24.71***
% Directives	.44	.40	.32	.17	105.65***
% Maternal Response	.31	.43	.11	.56	57.36***

*** *p* < .001

TABLE 2

Style Variables: Mean Scores Between
12 and 30 Months of Age

Style Variables	Age (months) 12	18	24	30	*F*-Ratio
Tempo of Play	1.65	1.55	1.67	1.64	n.s.
Focal Object Involvement (1)	.13	.11	.12	.20	108.71***
Focal Object Involvement (2)	.09	.08	.09	.13	54.06***
Object Diversity	.13	.13	.12	.13	n.s.

*** $p \leq .001$

TABLE 3

Structural Play Variables: Mean Scores[a]

Between 12 and 30 Months

Structural	Age (months)				
Variables[b]	12	18	24	30	*F*-Ratio
% Level 1	.71	.53	.47	.42	189.83***
% Level 2	.18	.20	.22	.26	32.94***
% Level 3	.01	.02	.02	.05	62.92***
% Pretend	.03	.13	.18	.24	148.03***
No. Level 1	1.16	.83	.79	.70	93.87***
No. Level 2	.32	.32	.37	.50	24.03***
No. Level 3	.01	.03	.04	.10	64.56***
No. Pretend	.06	.22	.28	.36	120.267***

[a] % scores are based on the number of activities within a given category divided by the total number of activities coded during an observation.

[b] Level 1 = one-object activities; Level 2 = part-whole and simple spatial combinations; Level 3 = constrained combinations.

*** *p* <.001

TABLE 4

Mother's Play Entries: Mean Scores
Between 12 and 18 Months

Mother Play Variables[a]	Age (months) 12	18	24	30	F-ratio
$\bar{X}$ M's Play Entries	3.51	2.62	2.70	1.83	67.48***
Elaborative Style Index	-.06	.21	.26	.26	16.93***

[a] $\bar{X}$ M's Play Entries = No. Play Entries per minute; Elaborative Play Style Index = Elaborating plus Helping minus Unrelated/Total number of entries.

*** $p < .001$

TABLE 5

Home Observation: Age Changes in Social Behavior

Variable	Age (months)				
	12	18	24	30	F-ratio
M. pos. emotion	.68	.74	.44	.46	11.06***
M. soc. stim.	.25	.28	.14	.14	8.28***
M. Verb. Stim.	.23	.27	.26	.19	5.89***
M. Unaccepting	.37	.27	.12	.06	15.508***
M. Resp. C. Soc.	.94	.95	.83	.75	14.65***
C. Soc. to O	.36	.61	1.06	1.26	20.37***
C. talk M.	.51	1.04	1.50	1.48	23.13
C. Resp. M. Soc.	.43	.41	.43	.50	3.56*
Mutual Physical	.14	.14	.12	.10	4.44**
Mutual Social	.10	.11	.14	.15	4.234**
Same Room	.84	.81	.72	.70	14.93***

* $p < .05$

** $p < .01$

*** $p < .001$

TABLE 6

Sex Differences: Language Variables

		Age (months)					F-ratio	
		12	18	24	30	$\bar{X}$	Sex	Sex x Age
Child Variables:								
Comp.	Boys	.07	.49	.93	.99	.62	5.62*	3.90**
	Girls	.07	.51	.94	1.01	.63		
% Words	Boys	.08	.25	1.33	2.15	.95	8.58**	3.30**
	Girls	.08	.46	1.69	2.40	1.16		
Palmer	Boys			7.20	13.70	10.45	9.06*	6.61*
CFI	Girls			8.10	16.92	12.51		
Mother Variables:								
Noun-Verb								3.88**
Diversity	Boys	.73	.72	.69	.79	.73		
	Girls	.67	.67	.78	.84	.74		

*p <.05

**p <.01

TABLE 7

Sex Differences: Children's Play and Social Behavior

Play and Social Variables	Boys	Girls	*F*-ratios
% Level 1	.55	.53	5.22*
% Level 2	.23	.21	4.59*
% SOA	.05	.07	10.82**
Object Diversity	.12	.13	5.07*
C. Soc. to O.	.07	.10	4.62*
C. Talk to M.	.10	.13	7.34**
M.-Unaccepting	.03	.02	4.18*

*$p < .05$

**$p < .01$

TABLE 8

Sex Differences: Mother's Play Entries

	Age (months)				F-ratio
	12	18	24	30	
Boys	3.47	2.55	2.88	2.05	3.16*
Girls	3.56	2.69	2.53	1.60	
	G>B	G>B	B>G	B>G	

*$p < .05$

TABLE 9

Mean Scores on Waiting Room Variables for Sex and Episode

Variables[1]	Boy	Girl	$\bar{X}$	Source[2]	F-ratio
M/C Distance					
Episode 1	1.947	1.856	1.902	S x E	5.957*
Episode 2	1.890	1.436	1.663	E	10.329**
Smiles M					
Episode 1	.532	.745	.639	S x E	5.099*
Episode 2	.940	.846	.893	E	13.969***
Vocs					
Episode 1	.261	.266	.264	S x E	ns
Episode 2	.207	.255	.231	E	5.538*

* $p < .05$

** $p < .01$

*** $p < .001$

1. M/C Distance = average distance between mother and child; Smiles = % children who smile; Vocs = #10 sec. intervals of Voc/#10 sec. intervals.

2. The main effect of sex was marginally significant for mother-child distance ($p = .06$) and not significant for the remaining measures.

TABLE 10

Children's Physical Contact with the Mother as a Function of an Unfamiliar Person[a]

	Age (months)		F-ratios	
	18	24		
Boys				
Ep. 1--Mother	.32	.29	S x A x E	4.07*
Ep. 2--Mother and Stranger	.36	.51	S x A	5.4**
X̄	.34	.40	Ep.	9.5**
Girls				
Ep. 1--Mother	.38	.32		
Ep. 2--Mother and Stranger	.60	.38		
X̄	.49	.35		

*p .05

**p .025

***p .005

[a] Physical contact = % of children who contact the mother at least once during a 5 min. episode.

TABLE 11

Summary of Child Factors Based on 4 Assessments

CF_1: Functional Social-Symbolic Competence (26%)

- Language
  - % Words (.853)
  - % Descriptions (.717)
  - % Demand (.591)
  - % Question (.651)
  - % Answer (.354)
  - Utt/min (.630)
  - Comprehension (.893)
  - % Modify (.417)
  - % Action (.791)
- Play (Lab Observation)
  - PMI (.737)
  - Level 1 (-.547)
  - Level 2, 3 (.308)
  - Pretend (.630)
- Social-Affect (Home Observation)
  - C Soc. O (.335)
  - C Talk M (.433)

CF_2: Achievement-oriented Problem Solving (13%)

- Language
  - % Demand (-.306)
  - % Answer (.657)

CF_2 (continued)

- Play
  - PMI (.457)
  - Level 2 (.358)
  - Focal Involvement (.752)
  - Narrow Preference (.742)
  - Executive Failure (.608)

CF_3: Specific vs. Diversive Exploration (12%

- Play
  - Level 1 (.580)
  - Level 2, 3 (.613)
  - Tempo (.932)
  - Object Diversity (-.774)
  - Focal Involvement (.315)
- Social-Affect
  - Negative Affect (-.538)

CF_4: Social Interaction-Preference M (11%)
(Home Observation)

- Soc. O (-.431)
- Talk M (.712)
- Affect M (.649)
- Resp. M Soc. (.646)
- Preference M (.931)

TABLE 11 (continued)

Child Factors Based on 4 Assessments

CF_5: Interaction-Proximity M

(Lab Observation) (7%)

Social Object Exchanges (.500)

C Expressive M (.721)

C Contact Object (-.355)

M-C Distance (-.731)

CF_6: Test Competence (6%)

Social Object Exchanges (.311)

Bayley-Binet (.630)

C Soc. O (.540)

TABLE 12

Summary of Maternal Factors Based on 4 Assessments

- MF_1: M. Sociability (20%)[a]
  - Verbal Stim. (.626)
  - Soc. Stim. (.350)
  - Effectiveness (.865)
  - Resp. C's Soc. Obj. (.450)
  - Same Room (.885)
  - Mutual Soc.-Phys. Contact (.418)
- MF_2: M. Verbal Directiveness (14%)
  - % Directive Speech (.639)
  - Question Style (-.939)
  - Question Complexity (-.923)
- MF_3: Social Mutuality (13%)
  - Verbal Stim. (-.576)
  - Mutual Soc. Obj. (-.638)
  - Mutual Soc.-Phys. Contact (-.746)
  - % Resp. C. Soc. (.760)
- MF_4: M. Articulate Non-directiveness (11%)
  - % Directive (-.424)
  - Play Entries (-.349)
  - % Describe People (.889)
  - % Complete Sentences (.675)
- MF_5: M. Non-Verbal Intrusiveness (9%)
  - % Interjections (.855)
  - Play Entries (.448)
  - % Describe Things (-.662)
  - % Complete Sentences (-.316)
- MF_6: M. Dominance (8%)
  - % Directive Speech (.369)
  - Play Entries (.438)
  - N-V Diversity (-.870)
- MF_7: M. Passive Responsiveness (8%)
  - Resp. C's Speech (.858)
  - % Directive Speech (-.340)
  - % Describe Things (.472)
- MF_8: M. Elaborative Play (6%)
  - Elaborative Play (.941)

---

[a] Proportion of variance accounted for by each factor.

TABLE 13

Child Factors: Age Effects for Standardized Scores

	Age (months)				F-ratio	Trends		
	12	18	24	30		Lin.	Quad.	Cub.
1. C. Functional SS Competence[a]	-1.27	-.41	.84	.83	663.64***	284.87***	17.95***	13.25***
2. C. Sustained Problem Solving	-.09	-.235	-.86	1.16	166.99***	44.85***	116.79***	49.03 ***
3. C. Specific-Diversive Exploration	.06	-.21	.13	.05	2.64*	ns	ns	5.93**
4. C. Social Interaction-Prox. M. (Lab.)	-.15	.05	.22	-.15	4.23**	ns	8.18**	ns

*p <.025

**p <.01

***p <.001

[a] The significant Age x Curriculum effects will be discussed in a later section.

TABLE 14

Maternal Factors: Age Effects for Standardized Scores

Maternal Factors	Age (months)				$\underline{F}$-ratio	Trends		
	12	18	24	30		Lin.	Quad.	Cub.
1. M. Sociability [b]	.20	.25	-.23	-.25	9.28***	16.02***	ns	4.77*
2. M. Directs vs. Questions [b]	.35	.43	-.11	-.64	35.76***	60.71***	8.11**	ns
3. M. Social Mutuality [a]	-.28	-.17	.36	.07	8.66***	12.85***	ns	7.40**
4. M. Articulate-Non-Directiveness [b]	-.79	-.07	.35	.51	52.04***	91.65***	8.31**	ns
5. M. Non-Verbal Intrusiveness	.43	.06	-.12	-.37	13.42***	32.17***	ns	ns
6. M. Dominance [b]	.16	.17	.17	-.46	13.75***	18.09***	10.52***	ns
7. M. Passive-Responsiveness	.09	.00	-.63	.56	35.03**	ns	41.94***	27.28***
8. M. Elaborative Play	-.32	.22	.19	-.10	.70***	ns	17.46**	ns

*$\underline{p}$ < .05

**$\underline{p}$ < .01

***$\underline{p}$ < .001

[a] Signs were changed to make positive scores index a high level of social mutuality.

[b] Significant interactions with sex and curriculum.

TABLE 15

Sex Differences: Factor Scores

	Age (months)					F-ratios	
	12	18	24	30	$\overline{X}$	Sex[a]	S x A[b]
Child Factors:							
1. C. Functional SS Competence						7.26**	5.06**[c]
Boys	-1.25	-.52	.68	.78	-.08		
Girls	-.28	-.30	.99	.88	.07		
3. C. Specific vs. Diversive Exploration						5.40**	ns
Boys	.30	-.10	.14	.26	.15		
Girls	-.17	-.32	.13	-.16	-.13		
6. C. Test Competence						11.12**	ns
Boys	.02	-.29	-.39	-.24	-.23		
Girls	.25	.29	.14	.17	.21		
Maternal Factor:							
6. M. Dominance						ns	6.44***[d]
Boys	-.01	.00	.42	-.33	.02		
Girls	.34	.34	-.08	-.60	.00		

** $p < .01$

*** $p < .001$

[a] df = 1/88

[b] df = 3/264

[c] The quadratic trend for the interaction is significant; $F = 6.87$, $df = 1/352$, $p = .009$.

[d] Linear ($F=10.27$, $df=1/352$, $p < .001$) and cubic ($F=4.59$, $df=1/352$, $p=.033$) trend are significant for the interaction.

TABLE 16

Birth Order Effects: Children and Mothers

	Age (months)					*F*-ratio		
	12	18	24	30	$\overline{X}$	BO	BO x S	BO x A
C. Functional SS Competence						3.77^{a}	ns	2.27^{b}
First born	-1.29	-.37	.93	.89	.04			
Second born	-1.25	-.45	.70	.66	-.09			
M. Sociability						13.18***	3.68^{a}	ns
First born	.45	.31	-.09	-.12	.14			
Second born	-.35	.06	-.52	-.59	-.35			
M. Verbal Directiveness						3.68^{a}	ns	ns
First born	.25	.27	-.22	.66	-.09			
Second born	.47	.64	-.08	-.43	.15			

---

^{a} $p = .056 - .059$

^{b} $p = .089$

*** $p < .001$

Appendix V, TABLE 17

Home Visit Calendar

Visits No.	C. Age	Language	Play	Social	Baby Only	Mother Only
			$\bar{X}$ Length of Home Visits[a]			
1 - 8	(13-15)	77.9	81.5	81.5	73.6	85.6
9 - 17	(16-18)	81.3	85.4	79.9	75.0	99.2
18 - 26	(19-24)	61.9	78.3	77.4	65.0	94.1
27 - 32	(25-30)	68.9	73.3	77.7	67.6	96.2
$\bar{X}$		72.5	79.6	79.1	70.3	93.0
			% of Missed Visits			
1 - 16		16.0	13.1	19.4	7.2	13.7
17 - 32		16.9	21.6	17.4	15.3	8.7
$\bar{X}$		16.5	17.4	18.4	11.3	11.2
			$\bar{X}$ Curriculum Exposure[b]			
1 - 16		17.8	17.9	17.2	18.3	21.2
17 - 32		14.5	15.8	17.1	14.9	23.2
$\bar{X}$		16.2	16.9	17.2	16.6	22.2

[a] in minutes; F (curriculum) = 8.3 $p < .001$

[b] in hours per 16 visits

TABLE 18

Baby Only vs. Mother Only: Sex x Curriculum Interactions for Linear Trend Scores

	Boys	Girls	*F*-ratio B vs. M[a]	*F*-ratio Linear Trend[b]
C. Test Competence				
Baby Only	-.11	.81	2.30	6.39**
Mother Only	.29	-.44		
(Test Only)	(-.36)	(.07)		
C. Soc. Interaction - Pref. M (Home)				
Baby Only	.36	-.60	3.95**	7.08**
Mother Only	-.52	.40		
(Test Only)	(-.12)	(.35)		
M. Sociability (Home)				
Baby Only	-.09	-.69	2.63*	4.35*
Mother Only	-.90	-.13		
(Test Only)	(-.56)	(-.17)		

---

[a] *df* = 3/86

[b] *df* = 1/88

TABLE 19

Maternal Passive-Responsiveness and Child Functional Social-Symbolic Competence: Cross-lagged, Contemporaneous and Autocorrelations between 12 and 30 Months.[a]

		All Children N = 100	Boys N=48	Girls N=52
Cross-lagged Correlations:	C12/M30	.00	.10	-.13
	M12/C30	-.39***	-.26	-.49***
Contemporaneous Correlations:	C12/M12	-.52***	-.51***	-.52***
	C30/M30	-.03	-.17	.04
Autocorrelations:	C12/C30	.25*	.02	.43**
	M12/M30	.17	.20	.15
Partial Correlations[b]:		-.31***	-.28*	-.34
No Cause Comparison[c]:		-.10	-.04	-.10
_z_ Difference between Cross-lagged Correlations[d]:		2.88***	1.74	2.03*
_z_ Difference between Cross-lagged Correlations and No Cause Comparison[d]:	C12/M30	.70	.29	.15
	M12/C30	2.18*	1.08	2.18*

* $p < .05$
*** $p < .005$

[a] Based on within cell correlations taking into account sex and curriculum.
[b] Controlling for child test competence at 12 months.
[c] The average of contemporaneous correlations attenuated for the reliability of maternal and child measures (r MPR = .50; r CFSSC = .70).
[d] Fisher's _z_ transformation.

TABLE 20

Maternal Dominance and Specific-Diversive Exploration: Cross-lagged, Contemporaneous and Autocorrelations for Boys and Girls at 12 and 24 Months

		Boys	Girls
Cross-lagged Correlations:	C12/M24	.10	.15
	M12/C24	-.39***	-.13
Contemporaneous Correlations:	C12/M12	.04	-.05
	C24/M24	-.04	.06
Autocorrelations:	C12/C24	.12	.21
	M12/M24	.06	.29*
Partial Correlation[a]:		-.39**	-.12
No Cause Comparison[b]:		.00	.00
_z_ Difference between Cross-lagged Correlations[c]:		2.44**	1.40
_z_ Difference between Cross-lagged Correlations and No Cause Comparison[c]:	C12/M24	.48	.75
	M12/C24	1.96*	.65

*_p_ .05
**_p_ .025
***_p_ .01

[a] Controlling for child's specific-diversive exploration at 12 months.

[b] The average of the two contemporaneous correlations attenuated for the internal reliability of the measures.

[c] Fisher's _z_ transformation.

Table 21

Summary of Family Structure Factors

	Family Network (+Extended, high SES vs. -Restricted, low SES)	Household Organization (+Nuclear, high SES vs. -Large Household, low SES)	Social Isolation- Integrati
+Family Contacts			
1. Family Visits C.	.47		-.47
2. C. Visits Family			-.40
3. No. Relatives Nearby	.42	.44	
4. Size of Household		.75	
5. Father participation in child care		-.54	
6. Family source of CC information	.41		(.28)
7. Years in New Haven	.45		
8. Non-parental Caregivers		.79	
Non-Family Contacts			
1. Non-Family Visits C.			-.68
2. C. Outings			-.41
3. C. Non-Family Soc. Contacts			-.62
4. Neighbor-Friend Sources of CC information	-.30		-.22
5. Media Source of CC information			-.38
6. Professional Consultation			
Family SES			
1. $\overline{X}$ MF Employment	.47	-.316	-.36
2. $\overline{X}$ MF Education	.59	-.22	
Maternal IQ			
1. PPVT	.67		
2. WAIS Performance IQ	.59		

TABLE 22

Intercorrelations: Family Structure Factors and Behavioral Measures

Factor/Age	Family Network (Extended, High SES vs. Restricted, Low SES)			Household Organization (-Nuclear, High SES vs. +Large Household, Low SES)		
	Total	Boys	Girls	Total	Boys	Girls
C. Sustained Problem Solving[a]						
12 months	.22*	.35**	.22			
18 months	.30***	.25	.25**			
C. Bayley - Binet[a]						
18 months	.27*	.30*	.22			-.25
24 months	.33***	.32**	.35**			-.33**
30 months	.28**		.40***			-.23
C. Test Competence						
12 months			.25			
24 months	.38***	.32*	.45***			
M. Passive-Responsive						
12 months	-.22*	-.24		.23*	.38**	
18 months				.28**	.26	.31**
24 months				.19	.20	.19
30 months	.35***	.29*	.41***	.21*		.31**
M. Elaborative Play[a]						
18 months				-.26**	-.24	-.29*
24 months		.36**		-.21*		-.25

[a] Omitted ages failed to yield significant correlations.

*$p < .05$

**$p < .025$

***$p < .005$

TABLE 23

Maternal Elaboration and Child Performance on the Bayley (12-24 months) and the Stanford-Binet (30 months)[1]

	Age (months)	Bayley - Binet Scores 12	18	24	30	Partial Correlation[a]		z Diff. Cross-lag Correlation[b]	No Cause Baseline[c]	z Diff. M C Cross-lag and No Cause[b]
M. Elaborates:										
Total Group	12	.31**	.29**	.31**	18	M12/C18	.21*	ns	.07	ns
(N = 100)	18	.07	.14	.19	.24*	M12/C24	.29**	2.10*	.05	1.92
	24	.02	.12	.11	-.04					
	30	.21*	.23*	.16	.20*					
Boys	12	.21*	.38**	.45**	.17	M12/C18	.36**	1.81	.06	ns
(N = 48)	18	.02	.07	.27	.36**	M12/C24	.40**	2.07*	.07	1.99
	24	.05	.19	.13	-.02					
	30	.22	.31*	.34**	.34**					
Girls	12	.42**	.20	.17	.19	M12/C18	.21	ns	ns	ns
(N = 50)	18	.13	.21	.11	.12	M12/C24	.14	ns	ns	ns
	24	-.01	.04	.10	-.05					
	30	.19	.14	.00	.06					

[a] Controlling for early child ability.

[b] z Fisher's transformation

[c] Estimated reliability of Bayley-scores, r = .80; M. Elaboration, r = .60.

*p .05

**p .01

Child's Activity: $A_1 \longleftrightarrow O_1$

Mother's Entry is Elaborative if she

either, $A_2 \longleftrightarrow O_1$

or, $A_1 \longleftrightarrow O_2$

Mother's Entry is Unrelated if she

$A_2 \longleftrightarrow O_2$

Figure 1 Mother's Play Style: Elaborative and unrelated entries: A = action; O = object.

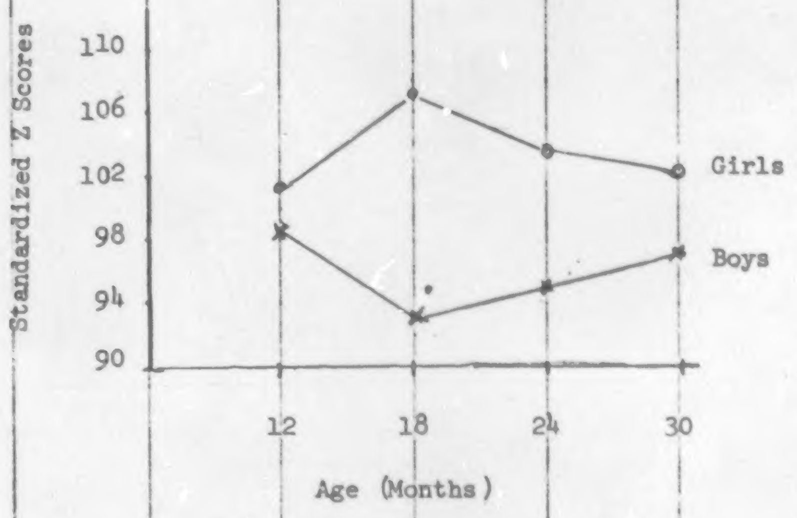


Figure 2 Children's standardized scores on Bayley and Binet Tests

Figure 3

Developmental Trends for Children's Functional SS Competence and Sustained Problem Solving and Mothers' Articulate-Non-directiveness and Passive-Responsiveness

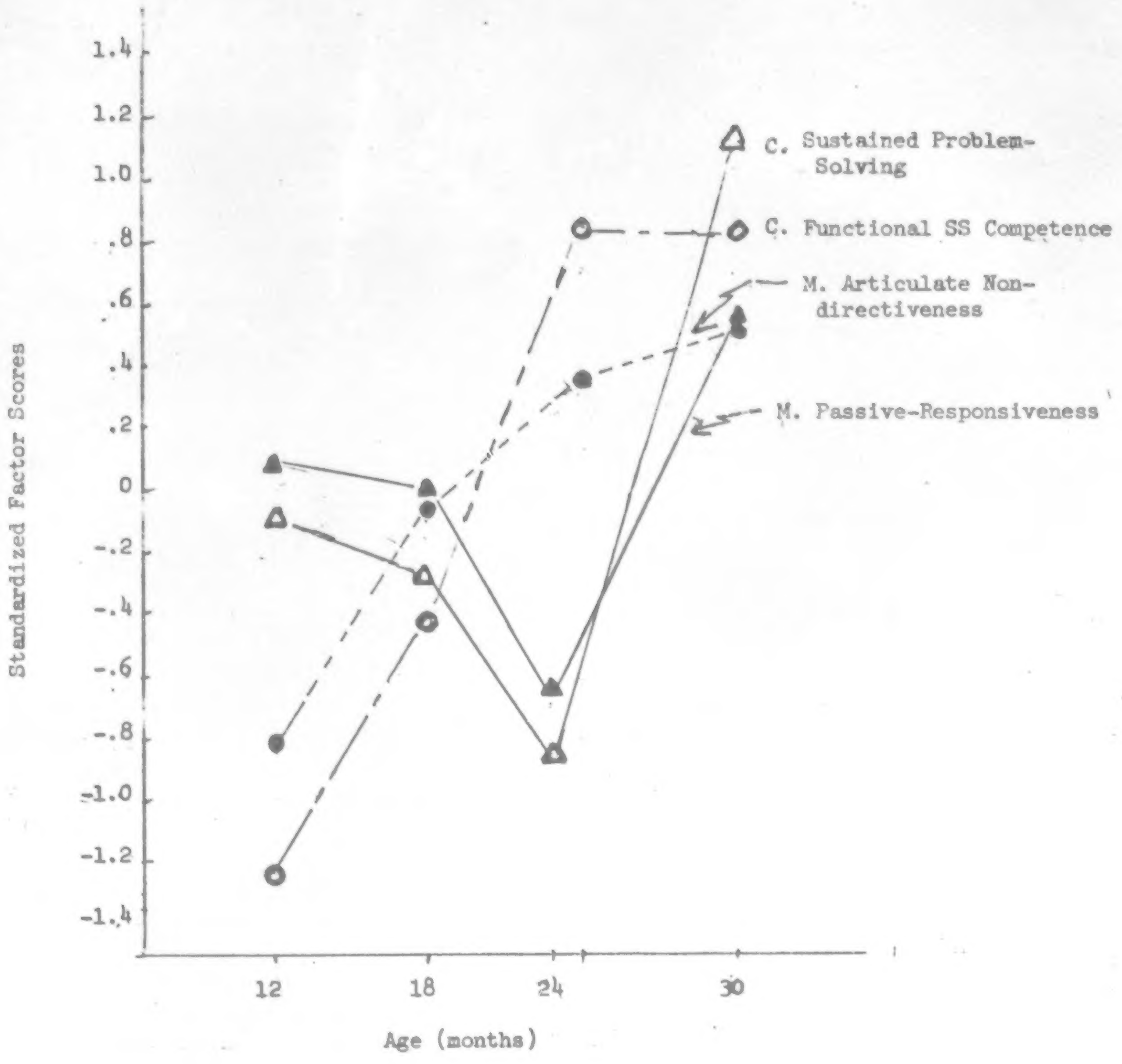


Figure 4

Functional Social Symbolic Competence

Sex x Age Interaction

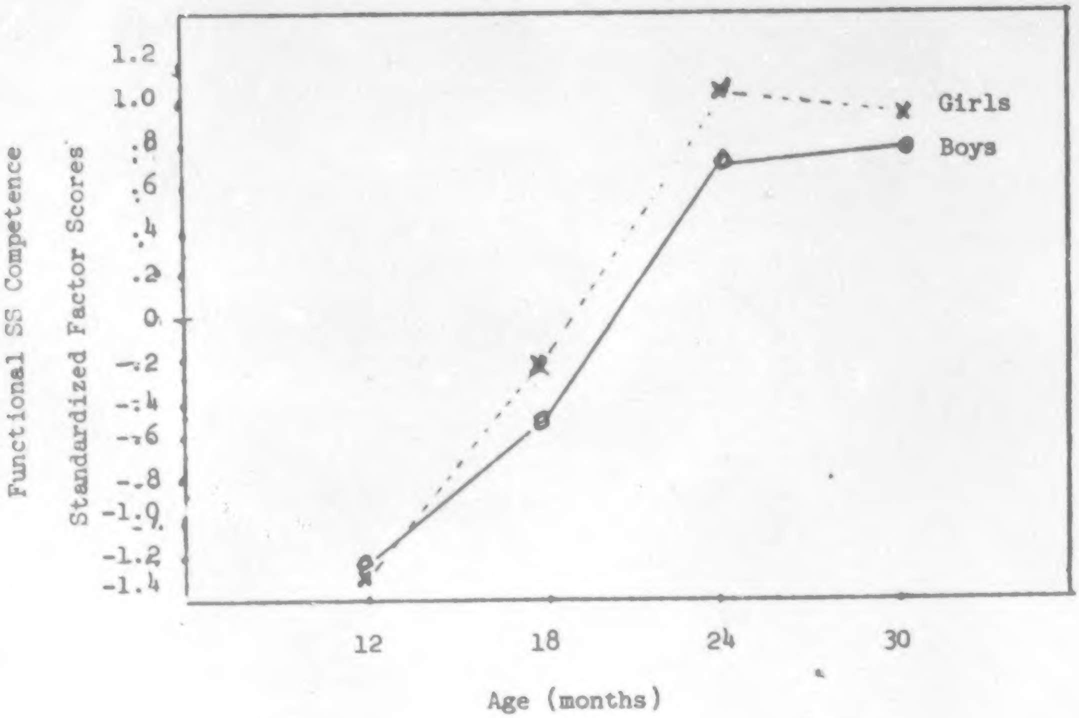
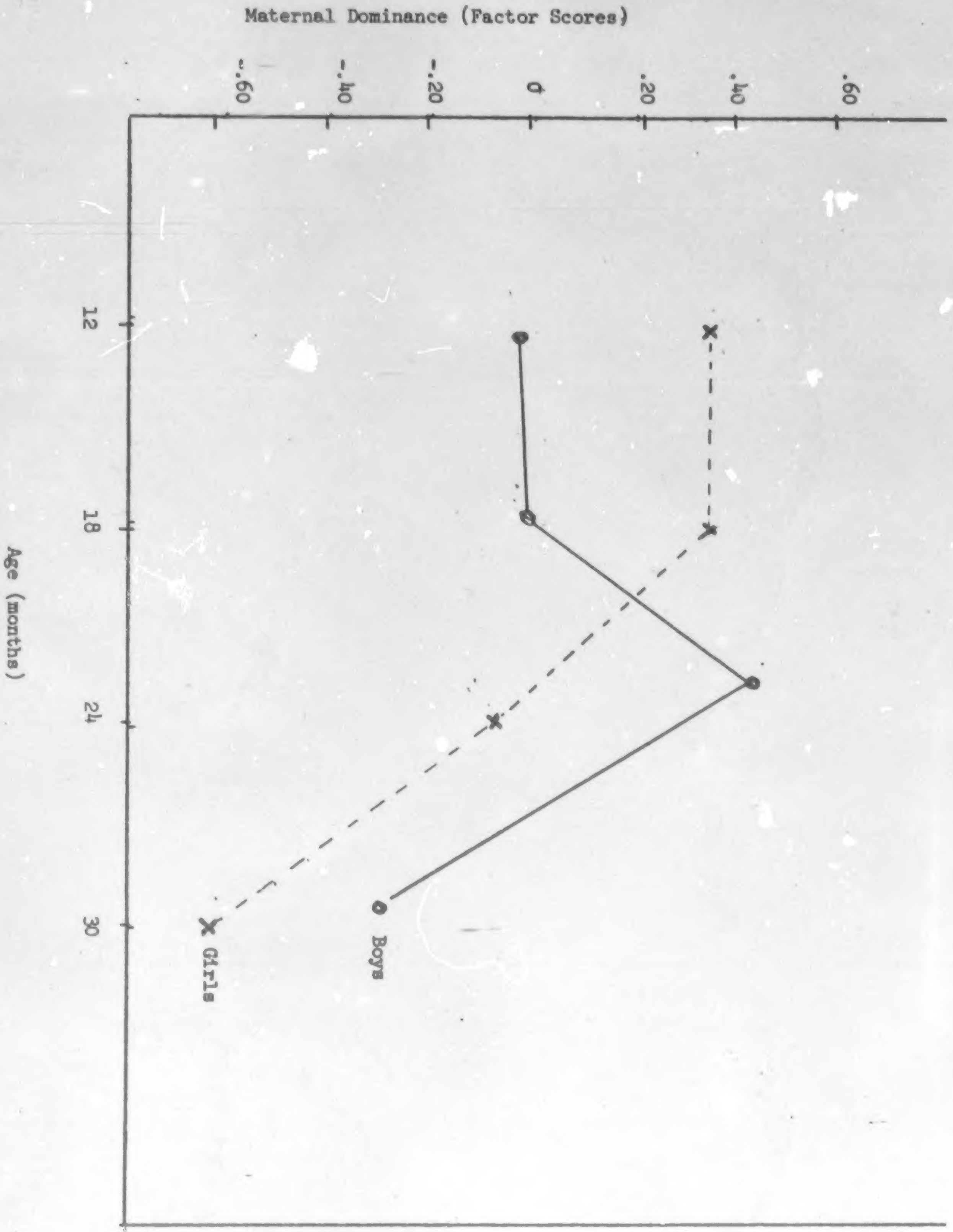


Figure 5 - Maternal Dominance as a Function of Sex



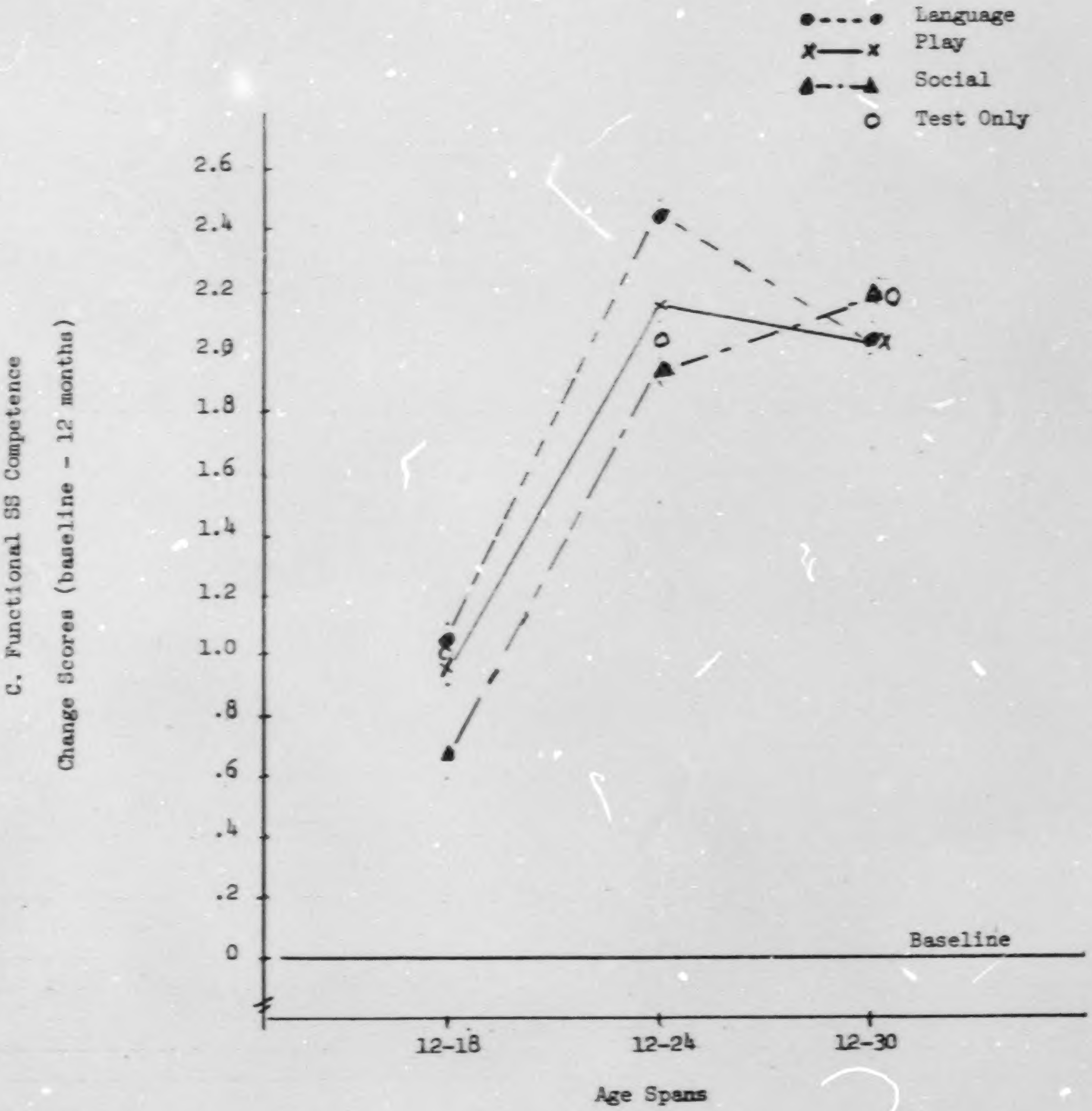


Figure 6 C. Functional SS Competence:

Change Scores over 12 month Baseline--

Language, Play and Social Curriculum Groups.

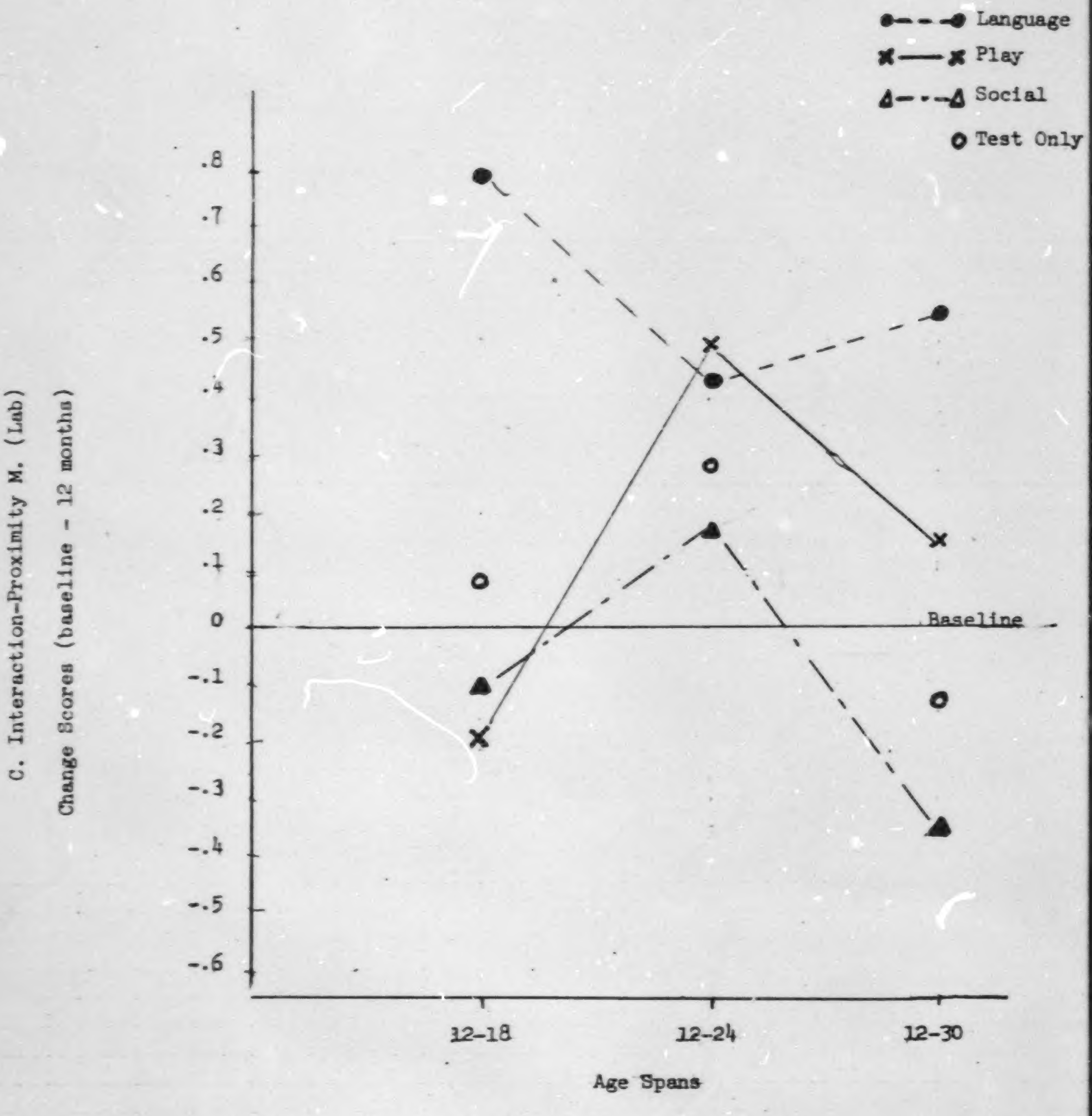
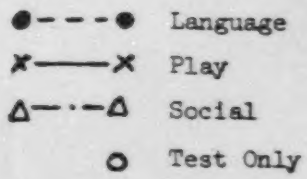


Figure 7 C. Interaction-Proximity M. in an Unfamiliar Situation: Change Scores over 12 month Baseline--Language, Play and Social Curriculum Groups



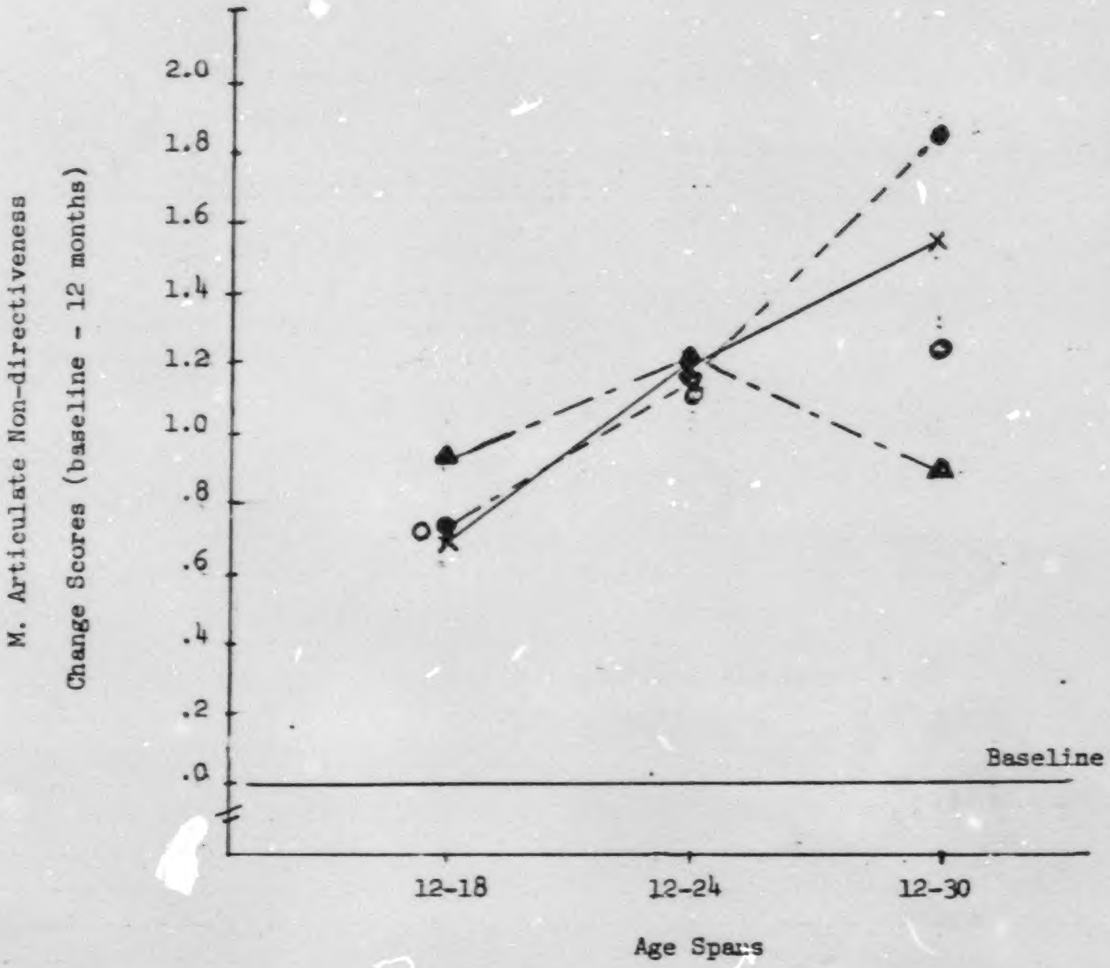


Figure 8 M. Articulate Nondirectiveness

Change Scores over 12 month Baseline--

Language, Play and Social Curriculum Groups.

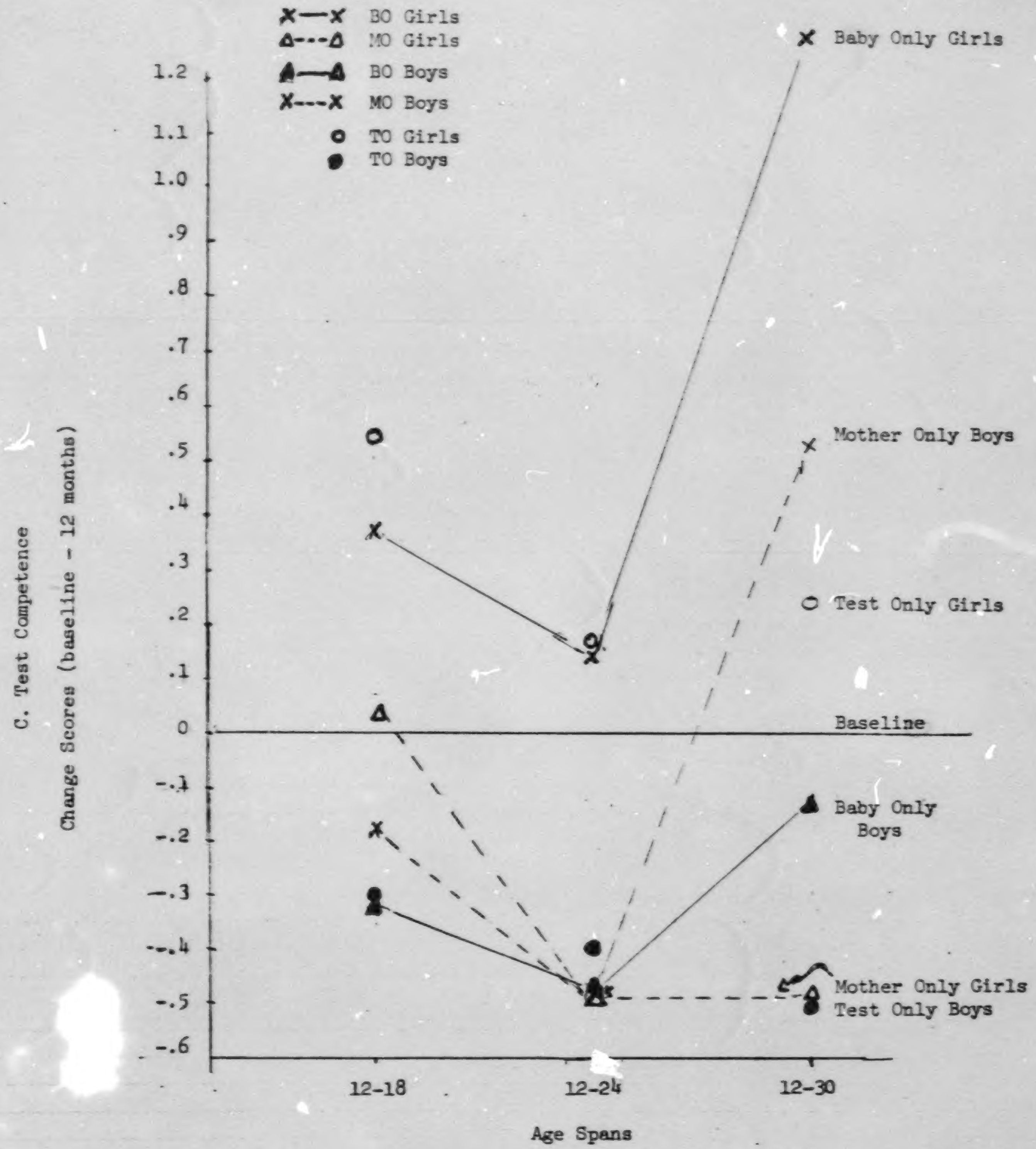


Figure 9 Test Competence: Baby Only-Mother Only Change Scores for Boys and Girls.

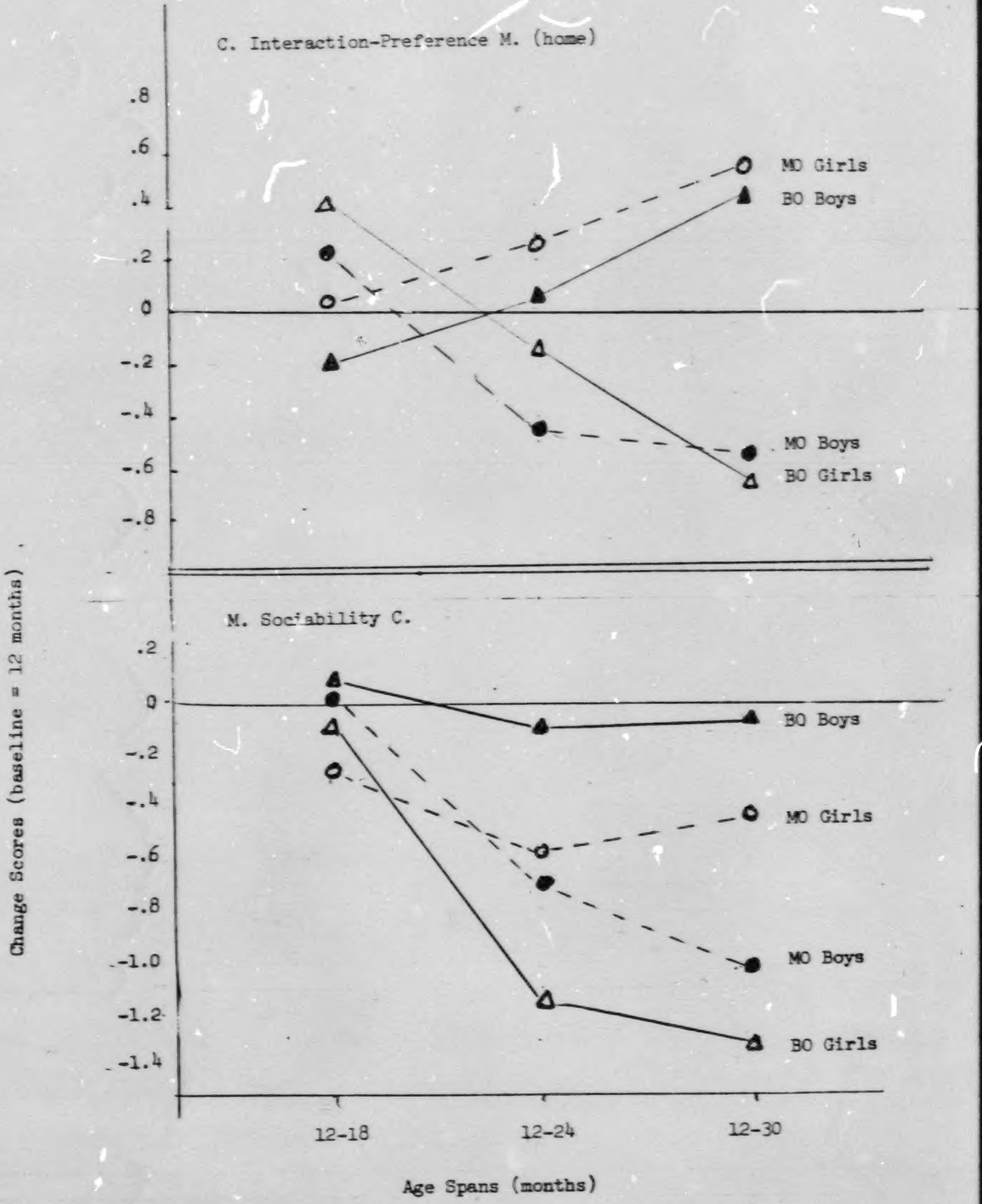


Figure 10 : C. Interaction-Proximity M. (home) and M. Sociability Change Scores over 12 month baseline for boys and girls.

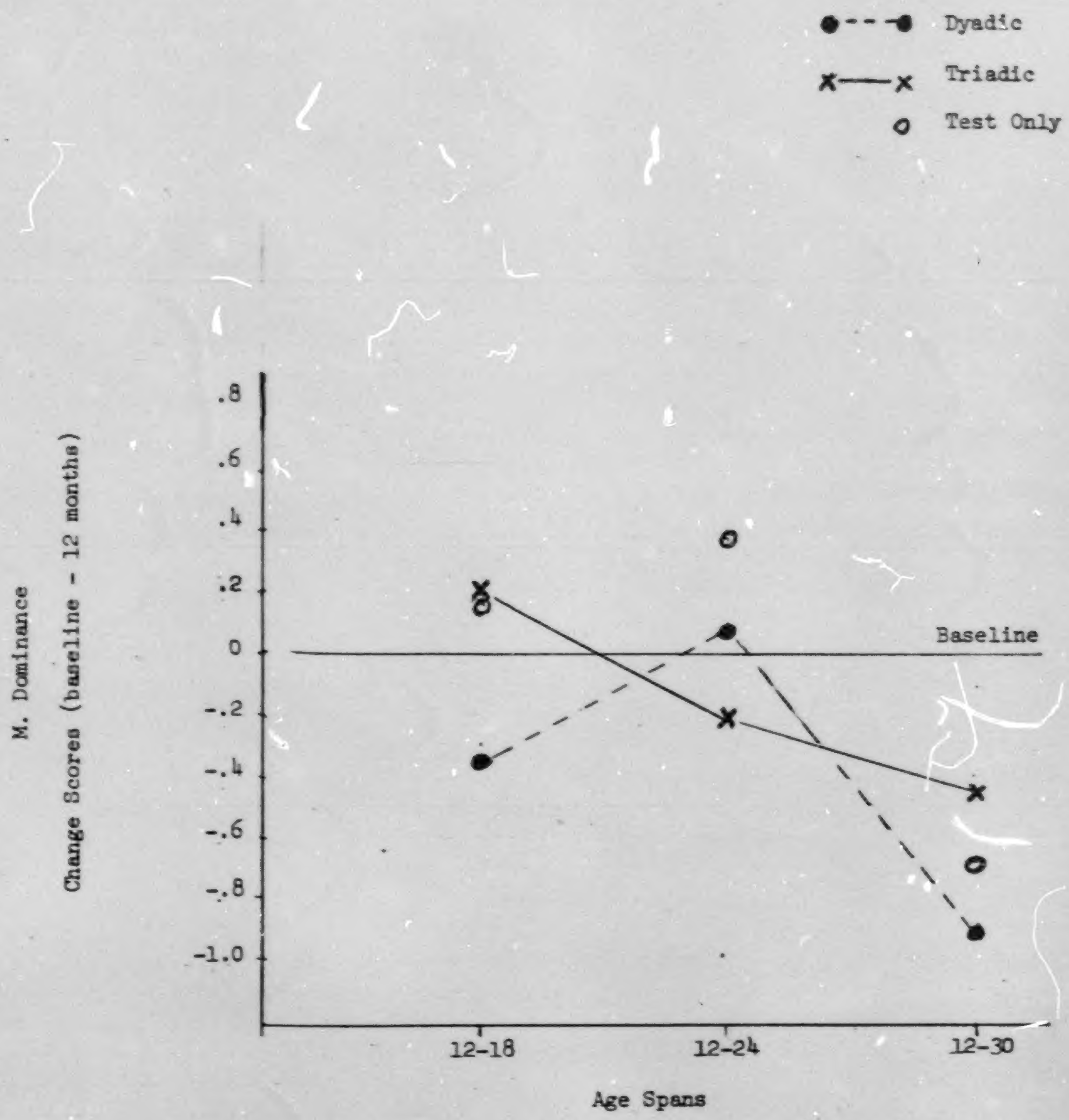


Figure 11 M. Dominance:

Change Scores over 12 month baseline—

Triadic and Dyadic Groups

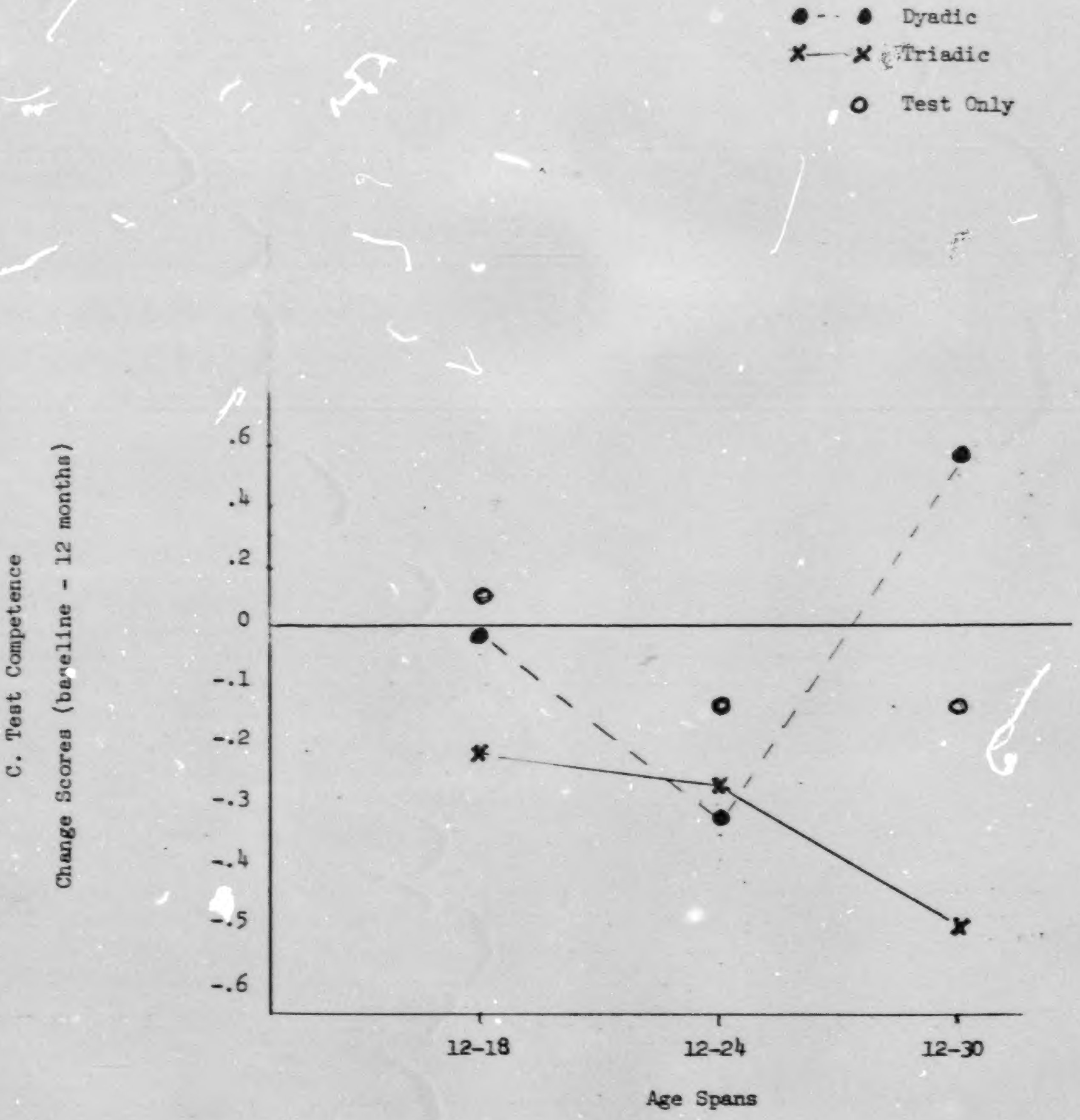


Figure 12 C. Test Competence:

Change Scores over 12 month Baseline--

Triadic and Dyadic Groups

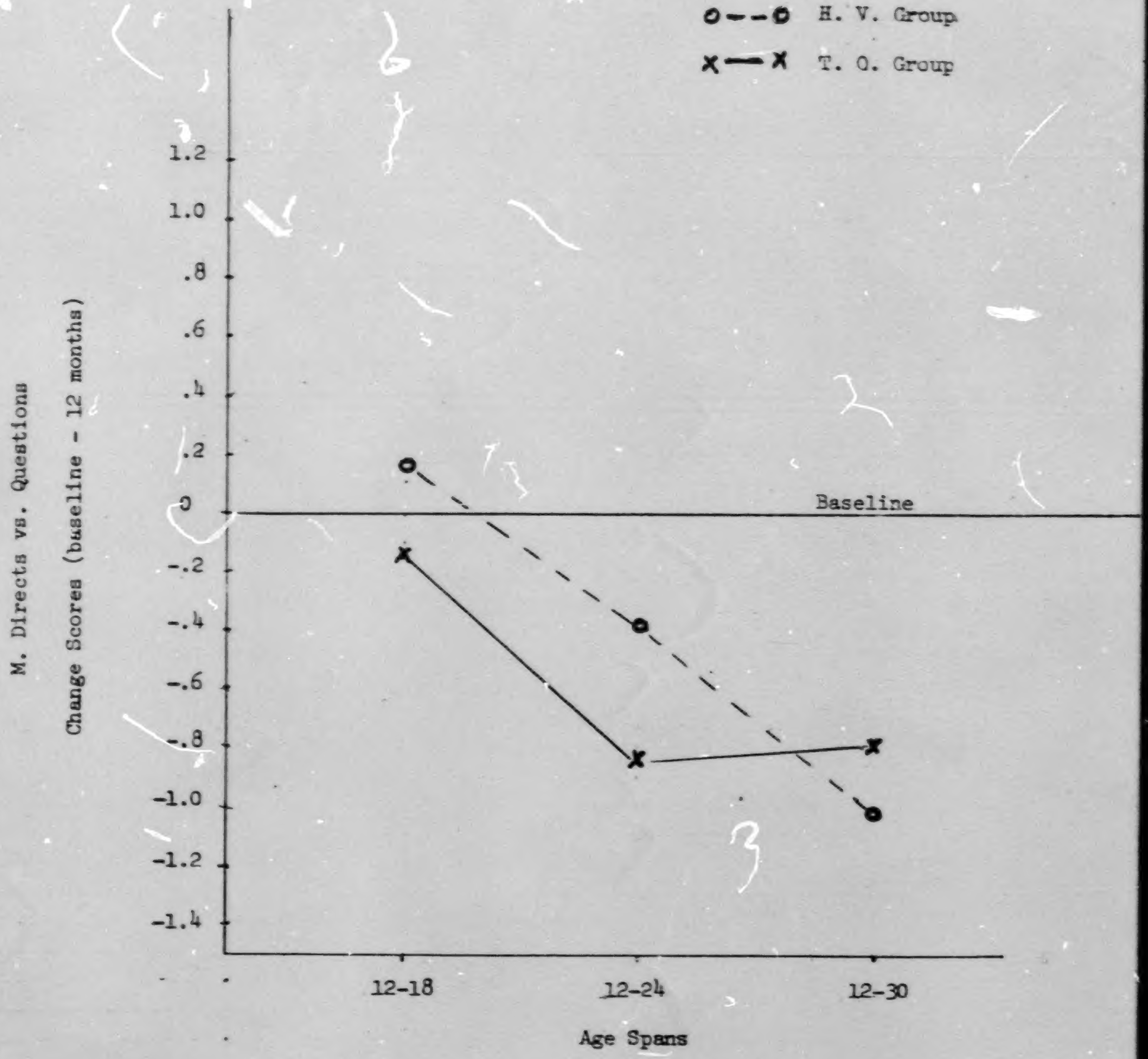


Figure 13 M. Directs vs. Questions

Change Scores over 12 month Baseline for

Home Visit and Test Only Groups

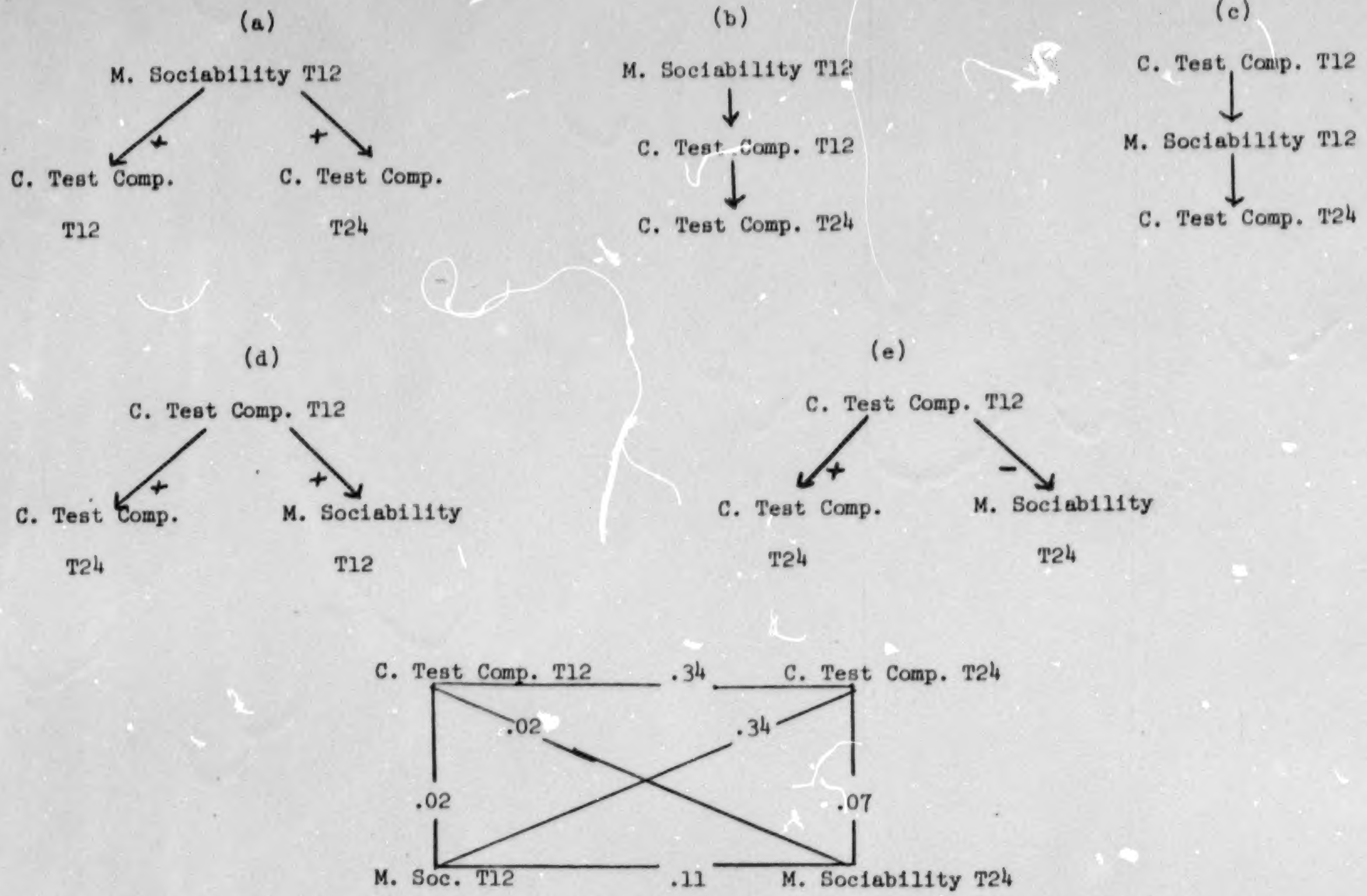


Figure 14 Correlations and plausible alternative hypotheses regarding the relation between Maternal Sociability and Child's Test Competence at 12 and 24 months.

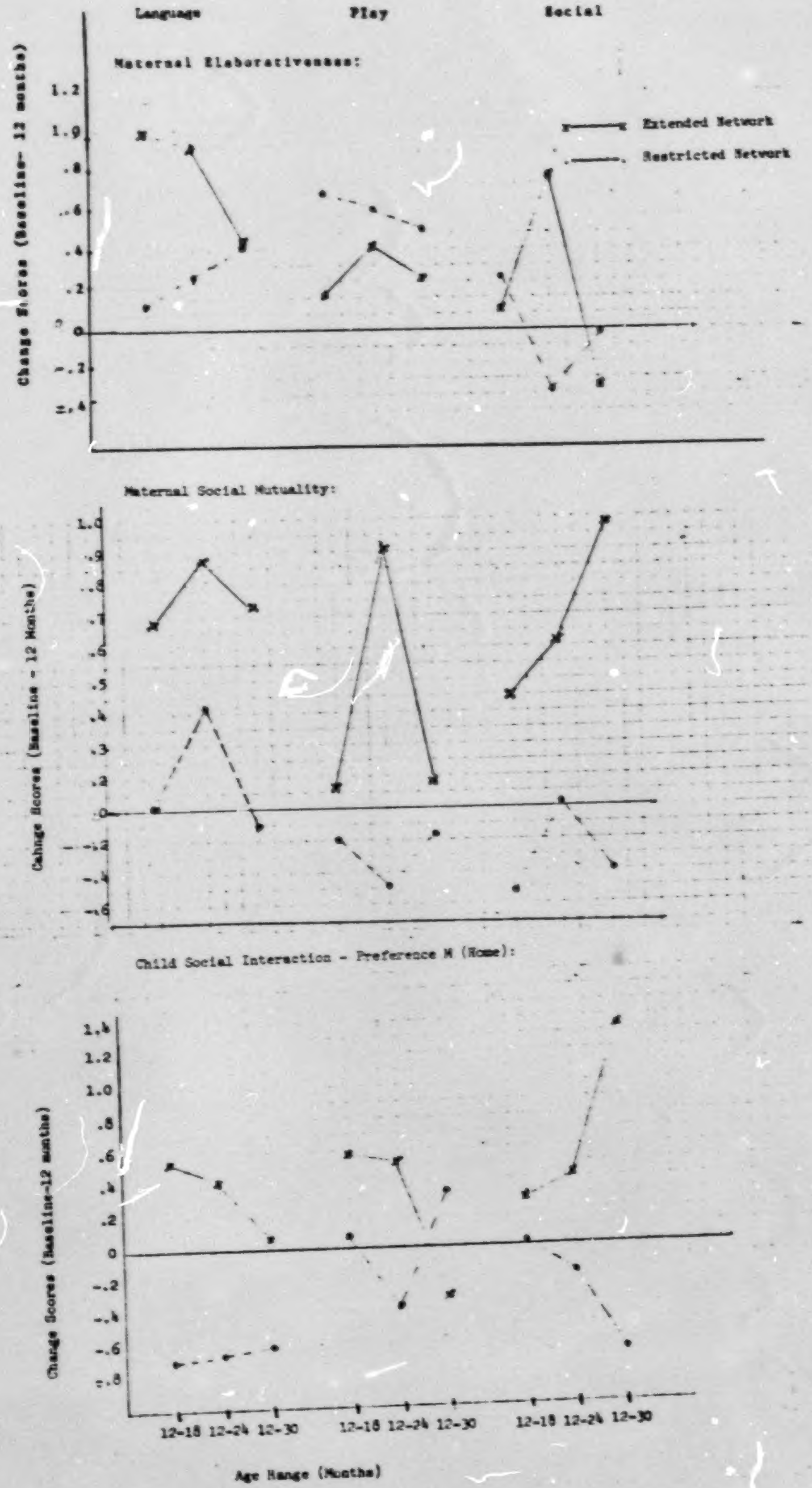


Figure 15 Maternal & Child Behavior as a Function of Core Curriculum and Family Network.

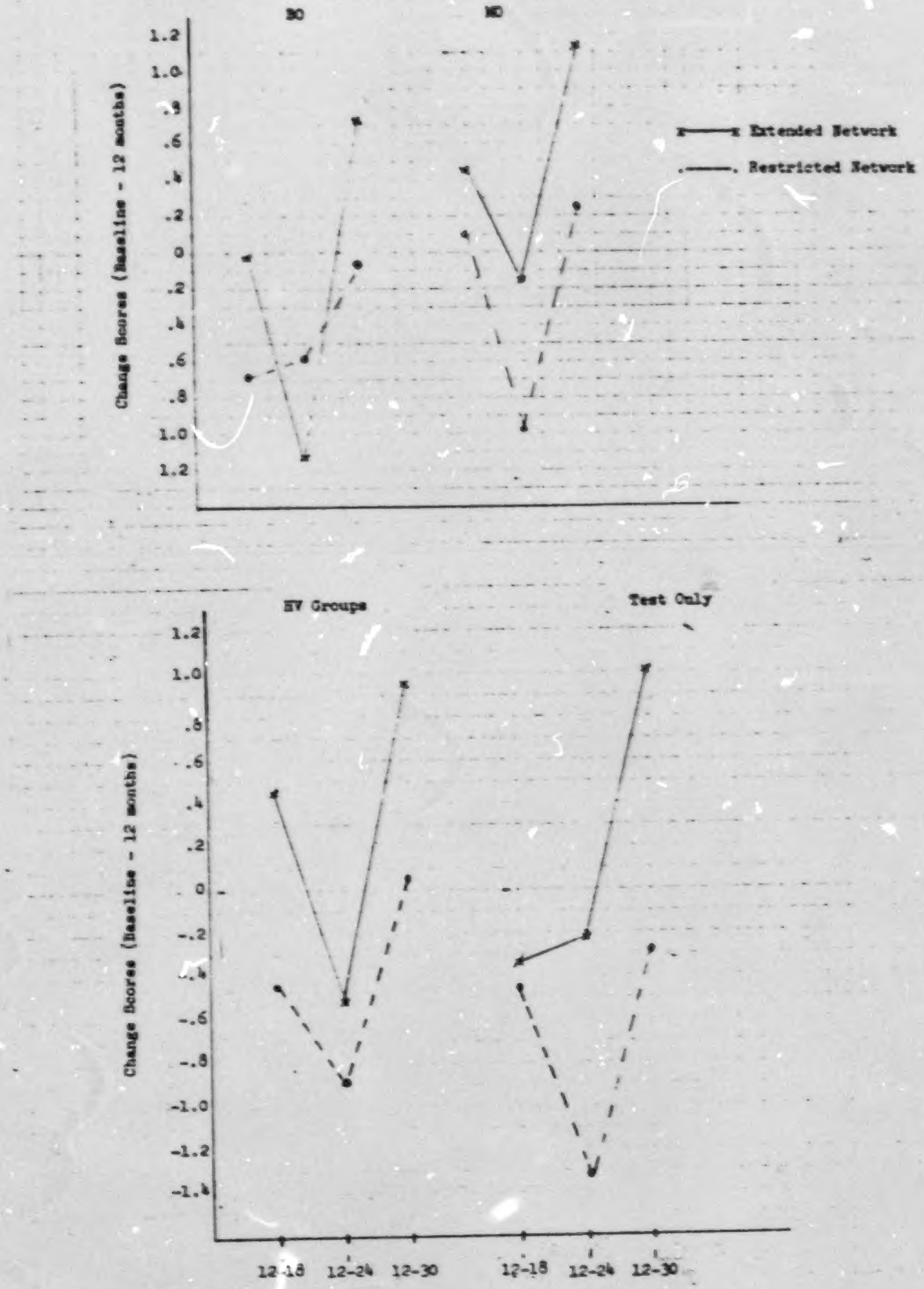
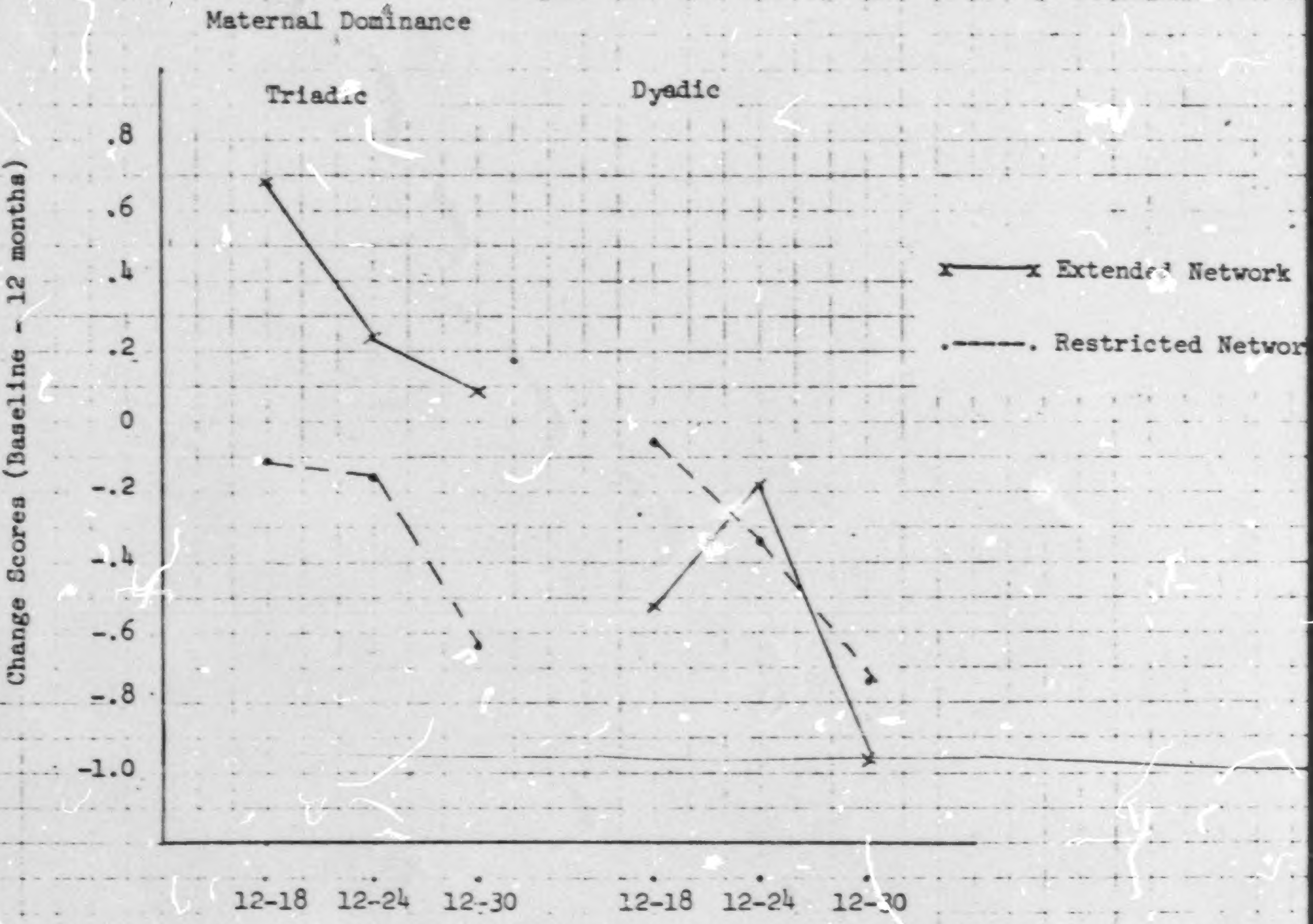


Figure 16 Maternal Passive Responsiveness as a Function of Family Network and Treatment Group.



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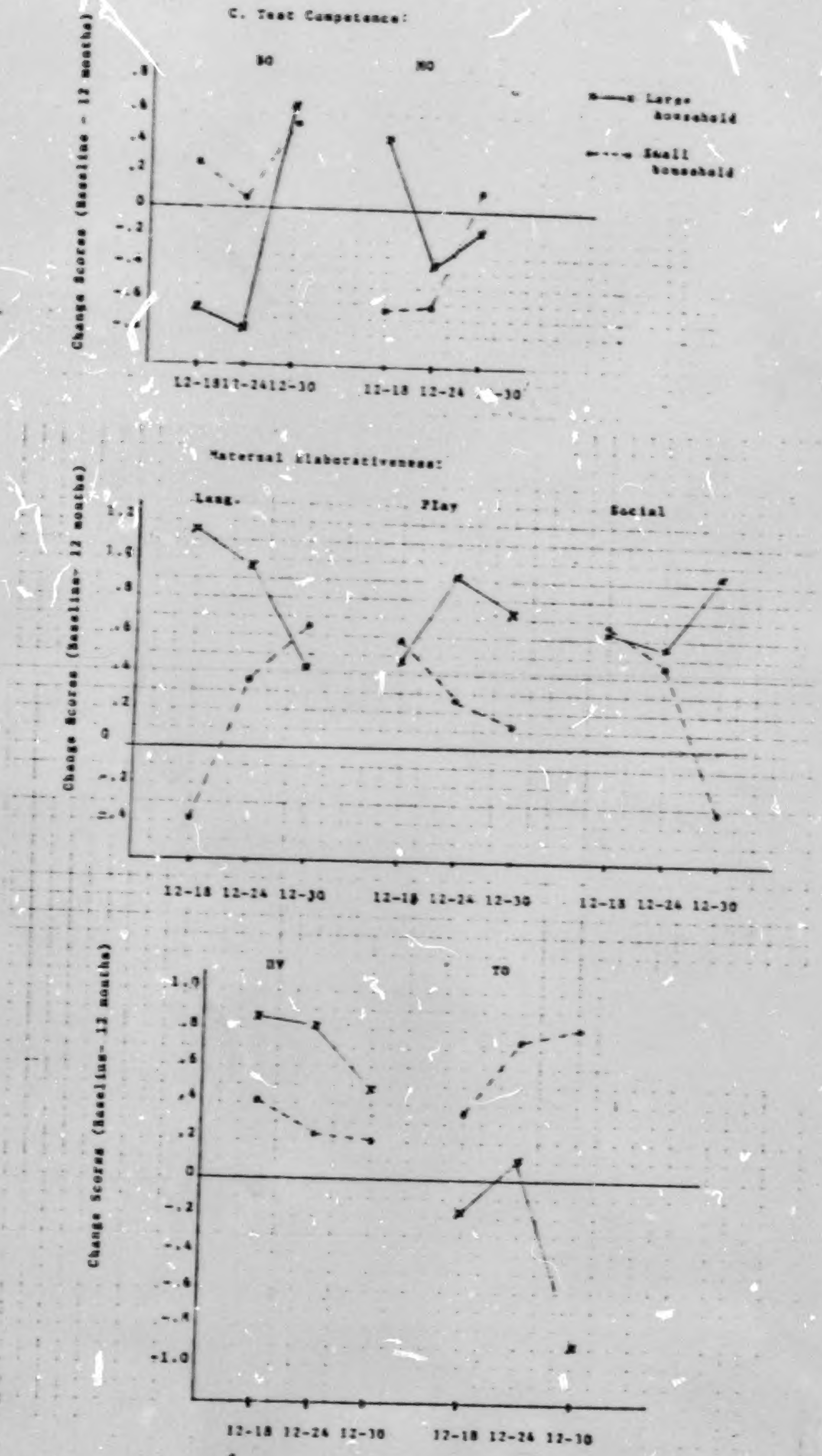

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AI Recruitment Procedures

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Appendix A, TABLE 1

Demographic Characteristics of Project and Hospital Sample[a]

	Mother's Age			Median	Father's Age			Median	Race		Father	Father's Occupation			1st
	<22	23-25	>26	Age	<22	23-25	>26	Age	Black	White	Absent	None	Blue Collar	White Collar	Born
Project															
Families N = 100	.41	.31	.28	23	.19	.30	.51	26	.12	.88	.03	.05	.60	.35	67
Drop-outs[a] N = 13	.46	.23	.31	24	.33	.08	.59	27	.23	.77	.08	.00	.78	.22	85
Refusals N = 12	.41	.18	.41	25	.23	.27	.50	26	.09	.91	.00	.00	.64	.36	68
Unreachables N = 43	.41	.16	.33	22	.22	.28	.40	25	.23	.77	.16	.06	.69	.25	47
Ineligibles (SES) N = 15	.07	.13	.80	27	.00	.14	.86	28	.07	.93	.07	.00	.57	.43	60
Total from Hospital															
Records N = 248	.41	.26	.33	23	.17	.30	.53	26	.17	.83	.08	.05	.63	.32	61

---

[a] Information was obtained from hospital records, checked whenever possible against project records.

[b] The following reasons were given for dropping out of the study: mother too busy (2), family or personal problems, including divorce, family conflict, ill-health (6), moving out of the area (5).

Appendix A, TABLE 3

Family Background - Demographic Information

	Mean	Med.	SD	Range	< 1%	4+%
No. relatives living in the area:	25	15	26.1	0-99	5	83
No. household members (other than M and B):	1.6	1.0	1.3	0-9	3	3
No. contacts with relatives per week:	3.3	2.0	5.1	0-35	23	21
No. friends seen per week:	2.9	1.0	4.6	0-30	31	18
No. trips by B outside home (shopping, park, visit):	1.4	1.0	2.1	0-9	44	10
No. adults seen by B daily (other than M or F):	.8	.0	1.5	0-8	67	3
No. adults seen by B 1-2 times per week:	2.0	1.0	2.9	0-21	34	11
No. times persons (including F) other than M cared for B during week[a]:	1.3	1.0	2.8	0-20	44	4
No. of different activities F engaged in with B[b]:	2.5	2.0	1.6	0-7	14	9
No. of different activities frequently engaged in by F:	.8	1.0	1.0	0-5	45	1
No. of years lived in area:	13.3	10.5	11.2	0-39	7	66

% <1 = 7
% 1-5 = 30
% 6-15 = 5
% 16+ = 58
% Expect to be here in 5 years: 87
% M belongs to a club (yes): 22
% F belongs to a club (yes): 39

[a] (i.e., fed, dressed, bathed, and so forth at least once)

[b] feeding, playing with, reading, and so forth

Appendix A, TABLE 3

Family Background - Demographic Information p. 2

M plans to work in Future:

% No plans: 15
% Maybe: 34
% Yes 50

Families who moved during study: 30%

Sibs born during the study: 16%

Fathers who changed jobs: 21%

Fathers who became unemployed: 5%

Mothers who became employed: 21%

Appendix A, TABLE

Maternal PPVT, WAIS Performance IQ, and SES Indicators

	M.	$\overline{X}$ MF	$\overline{X}$ MF	WAIS Performance					Perf.
	Ed.	Ed.	Occ.	DS	PC	BD	Pa	OA	IQ
$\overline{X}$ MF Ed.	.70***								
$\overline{X}$ MF OCC.	.41***	.38***							
M. WAIS Perf. Sub Scales:									
Digit Sym.	.31***	.35**	.19						
Pic. Comp.	.18	.23*	.25*	.39***					
Block Des.	.18	.24*	.18	.40***	.43***				
Pic. Arr.	.10	.14	.22*	.36***	.46***	.45***			
Obj. Ass.	.09	.08	.14	.30**	.45***	.51***	.46***		
M. Perf. IQ	.22*	.26**	.26**	.59**	.71***	.70*	.64***	.75***	
M. PPVT	.32**	.38***	.22*	.44**	.50**	.43***	.45***	.41**	.53***

Appendix A, TABLE

Intercorrelations: Family Background Variables Maternal IQ and SES Indicators

	L	2	3	4	5	6	7	8	9
1. No. Family Visit B.									
2. No. Outings									
3. No. Visits to Relatives		.44***							
4. No. Non-parental Caregivers									
5. No. Relatives Nearby				.27**					
6. Non-relatives sees B. Regularly	.34**	.22*	.27**	.26					
7. Father Participation				-.34**					
8. No. in Household (+ M and C)				.46***	.20*				
9. Years M lived in Area			.31**						
10. M. PPVT									.25
11. M. WAIS									
12. M. Ed.									
13. $\overline{X}$ MF Ed.			.24*			.21*	.23*		
14. $\overline{X}$ MF Occ.^{b}			.22*			.23*		-.24	

A6

Appendix A, TABLE

Summary of Family Structure Factors

	Family Network (+Extended, high SES vs. -Restricted, low SES)	Household Organization (+Nuclear, high SES vs. -Large Household, low SES)	Social Isolation-Integration
+Family Contacts			
1. Family Visits C.	.47		-.47
2. C. Visits Family			-.40
3. No. Relatives Nearby	.42	.44	
4. Size of Household		.75	
5. Father participation in child care		-.54	
6. Family source of CC information	.41		(.28)
7. Years in New Haven	.45		
8. Non-parental Caregivers		.79	
Non-Family Contacts			
1. Non-Family Visits C.			-.68
2. C. Outings			-.41
3. C. Non-Family Soc. Contacts			-.62
4. Neighbor-Friend Sources of CC information	-.30		-.22
5. Media Source of CC information			-.38
6. Professional Consultation			
Family SES			
1. $\overline{X}$ MF Employment	.47	-.316	-.36
2. $\overline{X}$ MF Education	.59	-.22	
Maternal IQ			
1. PPVT	.67		
2. WAIS Performance IQ	.59		

Appendix B: The Curricula

BI Overview: Core Curricula See table [illegible]

TABLE B1 Home Visit Calendar

Home-Based Educational Curricula
for Mothers and Infants

Nancy Apfel & LaRue Brion

Based on a study of Infant Education funded by the Office of Child Development, Department of Health, Education and Welfare Grant #OCD-CB-98 Awarded to William Kessen and Greta G. Fein, Co-principle investigators.

Many mothers today find child-rearing, with all its complexities, a lonely undertaking. The majority of American families no longer live in close proximity to a whole network of relatives, such as grandmothers, aunts, and cousins, who used to be a rich source of information about children and traditional methods of child-rearing. There are few community-support systems available to help parents obtain basic information about early childhood and often there are few interested adults with whom to share the joys and worries of parenthood.

The federally funded program* "Curriculum Research in Infant Education" was designed to help fill this void by developing curriculum materials for a home-based educational program for families with children between the ages of 12 and 30 months. Some 100 middle-income families living in the greater New Haven, Ct., area participated in the year and a half long program. Each family was visited regularly by a trained Home Visitor. The curriculum materials guided the Home Visitor's presentation of current knowledge about children's development and ideas for parent-child activities. Three independent curricula, which placed different emphasis on children's language, play, and social development, are briefly described in this booklet along with some of the problems, challenges, and satisfactions which inevitably accompany home-based ventures.

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*Office of Child Development; Department of Health, Education and Welfare.

**The curricula, in their entirety, and further information are available through the ERIC Clearing House.

IMPLEMENTATION OF THE PLAY CURRICULUM

Goals of the Curriculum

The Play Curriculum is based on and grows out of a firm conviction in the value of spontaneous play as a learning activity. Play offers children a wide choice in what they do. The curriculum attempts to enhance two dimensions of that activity: the range of things upon which a given activity is attempted, and the diversity of actions performed on a given thing. The home visits are designed to enlist the mother's aid as observer, teacher, and research assistant by acquainting her with techniques for recognizing and facilitating "pretend," "relational," and "manipulative" play. The theory that children play most creatively when they run their own show is central to the play curriculum. Mothers are encouraged to join their children's play, using an elaborative play style; that is, proposing a variation on the child's play theme and then leaving it up to the child whether to pick it up or ignore it.

The Pattern of a Typical Visit

A visit in the play curriculum proceeds as follows:

a.) A review of the child's activities over the previous week. Mother and home-visitor discuss the mother's written accounts of the child's play.

b.) Introduction of the toy set. The home-visitor asks the mother for additional items from around the house that would fit in with the theme of the week.

c.) Observation of the child's play. Mother and home-visitor fill out a form describing his activities.

d.) Play session. The home-visitor asks the mother to participate in three-way play (mother, child, home-visitor). While playing with the child they discuss adult-child play styles.

e.) New forms left to do during the week new toys left for child, last week's toys collected and taken.

During the visit the emphasis is on observation of the baby's play, with appreciation of his achievements shared between home-visitor and mother.

The following excerpts from the home-visitor records give some color to this outline of activities.

"The child was more interested in small toys and spent most of his time carrying them and putting them in larger toys. The mother felt he was more successful with them. They made a ramp for the cars, which the child enjoyed. He picked up on her (the mother's) elaborations with a good many of the toys. The mother said he's either completely involved with the toys she gives or he ignores them--his play is intense."

Another home-visitor writes: "The child was not as attracted to this toy set. During the observation time his interest faded fast and he wandered off. In our play session together he became more interested and loved opening and closing the cigar box, putting balls in the egg box, and filling and dumping boxes. I used this as an illustration of how adult participation can enhance a child's interest and activity."

The Pattern of Visits Over Time

Visit 1 is used to introduce the project and to get acquainted with the mother; to explain to her that a child's play is a learning process and to acquaint her with what a child is learning from his play; to acquaint her with a method and simple vocabulary to describe her child's play; to play with the child, elaborating on the child's play. The basic format, consisting of interactions among mother, child, and home-visitor, is established.

Through Visit 4 the mother continues as observer only, sharpening her skills by learning to fill out forms on Play Description, Developmental Milestones, and Make-Believe. These forms serve the purpose of focusing her observations and providing a record of the child's development. These forms and pictures of the baby at play are made into a Baby Book for the family. The impact of these is best illustrated by a quote from a home-visitor's records: "The mother was thrilled with the pictures of the child playing. We mounted them on construction paper and added them to the book. It certainly added an appealing beginning to the book." These first few visits are also used to casually introduce the three kinds of play, "pretend," "relational," and "manipulative." Toy sets were designed to elicit basically one of these three kinds of play behavior. The following list gives examples of toy sets by category.

1. Pretend Play--make-believe feeding (cups, spoons, pot, bowl, doll, stuffed animal); make-believe grooming and dressing (toothbrush, cloth, powder can, mirror, hair brush, bangles, hat, bowl, doll, animal); make-believe sleeping (box, cover, pillow, bottle, carton).
2. Relational Play--topological relations (pop beads, stack toy, cardboard tubes and balls, puzzles, egg poacher with top and inset, coffee pot with parts, nesting cups).
3. Manipulative Play--noisemaking activities (drum, pail, wooden spoon, keys on a ring, anything for banging and shaking); open-close and in-out (cigar box, egg carton, pail, shovel and assorted small things); large muscle activity (sturdy cardboard cartons, large suitcase, chair for baby to climb onto and into); circular displacement (cars, pulleys, push toy).

The toy sets over visits change as the child grows older but the basic premise remains the same. Different kinds of toys promote different kinds of play. New forms are added during this period--the Baby Day Record, Play Observation, Adult-Child Play, Attraction-Aversion,Multiple Use, Yes-No (rules), and Stability and Change. The development of a supportive and "elaborative" play style by the mother is stressed continually. "Helping" and "imitation" are also used but the cultivation of a non-obtrusive use of "elaboration" is thought to be most important.

Visit 5 introduces the mother as an active participant. The "pretend" theme of this visit seems to be the easiest point of entry. From now through Visit 15 the various kinds of play are explored in depth, with the recurring visits used as comparison checks of the child's developing abilities.

During this time the use of the "second basket," stocked with toys and household objects provided by the mother, is also promoted. We bring in the notion that a toy to a child is something that he can do something with or to. The "second basket" leads into the more general theme of the organization of the home in order to provide optimum play opportunities for the child. Even if the home is well-organized from a child's point of view, it might be possible to enrich it further in order to give him more things to play with and more places to play. Visits 16 through 19 explore these possibilities and also use forms Involvement Observation, Empty Hands, How Things Are Used and Mini-Study.

Beginning with Visit 20, the curriculum introduces Special Toys, commercial toys which pose a particular problem or learning opportunity. These toys are left in the home for the mother to use with the child over the two-week period. We suggest to her that she choose a special quiet time each day when she can spend five or ten minutes playing with the child with just these toys. This is a method of encouraging her to use a helpful, elaborative style with her child. When mother and child's attention is focused on one toy, unrelated entries into the child's play are less likely. This is also to help her develop criteria for wise selection of commercially made toys. It is important for the mother to be aware that there are many uses for a given toy besides the one intended by the designer. Whatever the child wants to do is "right." Some of the toys used were the Fisher-Price Houseboat, puzzles of varying levels of difficulty, Magic Slates, chalkboards, and a form box.

Visits 28 through 32 are now made on a monthly basis and are divided into two parts: Play, including newly added plastic media such as play-dough, and a new emphasis on the child's participation in household activities, with Montessori-inspired tasks. The child is encouraged to help set the table, serve refreshments, and clean-up afterwards. Cognitive components of this activity (grouping things, establishing one-one correspondences), sensory-motor components (pouring), socialization and sheer pleasure are stressed. On different visits, the children polish shoes, plant seeds, and receive an introduction to household carpentry.

At the final visit we discuss and review the program with the mother. She has a chance to state what she has liked and disliked about the project. We reminisce appreciatively about how far her child has come in the year and a half we have been visiting them. Throughout, we have tried to stress the needs of a changing, growing child for developmentally appropriate experiences with materials and to extend the sense and spirit of play to areas which often become demanding and directive. We talk about how she can continue in this vein and also emphasize the concept of change and stability in any given child. How has he changed, how has he remained the same?

The Play Curriculum: As It Was

The Play Curriculum encourages the mother to join her child in play. The suggested play style is an elaborative, helpful one where the mother is attuned to her child's interests. Mothers in the curriculum differed greatly in their inclination to become involved in 'Child's Play.' There were those mothers who enjoyed playing with their children and were eager to hear and talk about adult play styles. New ideas for making toys out of household objects and for different play activities were welcomed by most mothers. Among these involved mothers were those who felt the playtimes were tests of skill and tried to teach the children the "right" way to handle the materials. The home-visitor's role in these cases was to show the mother that the other creative used a child makes of a toy are sometimes more interesting and valuable for him than the manufacturer's prescribed usage. Together the home-visitor and mother observe the explorations a child carries on and might note, for example, that to use the rings from a stack pole as a hat or bracelet, or to pile them or line them up instead of fitting them on the pole in order, are instructive also.

There were some mothers who declined at the beginning of the program to get involved in play with their children for a number of reasons--other things to do, fatigue, etc. The home-visitors attempted to generate excitement about the child's activities and developmental changes. This enthusiasm coupled with developmental information and appealing play materials was contagious. Most mothers found real enjoyment and even amazement in their children's activities and progress.

IMPLEMENTATION OF THE LANGUAGE CURRICULUM

Goals of the Curriculum

Children's accumulation of a vocabulary of 200 to 300 words is one of the more striking developments of the second and third years of life. While some children accomplish that challenging but necessary task far more easily than others, improving vocabulary is an important aim of the language curriculum. In addition to promoting vocabulary, our goal is to help children appreciate the multifold uses of speech. The mother is regarded as the major source of linguistic information for the child; it is primarily through her speech and activities that the curriculum attempts to affect the child's language.

The Role of the Home-Visitor

On her first visit to a family participating in the Language Curriculum, the home-visitor conveys to the mother these goals. She explains that the child will learn to speak without our help, but that we want to help her child eventually become a person who can speak clearly, who understands what others say to him, and who uses language to communicate ideas and express feelings. The home-visitor emphasizes that we are not interested in making her child speak sooner, but we would like him to speak well when he begins to talk. The mother's active participation is essential to the program since she is the child's major language teacher. The home-visitor and she are fellow-investigators of the child's early language, exploring his speaking abilities and level of comprehension. The home-visitor's other major role is providing the mother with ideas about what she can do to promote her child's language development.

Pattern of a Typical Visit--the Strategies

A language visit typically begins with the mother telling the home-visitor about the child's latest language developments--new words understood and spoken and the child's reactions to specific language teaching activities. In one of the early visits the home-visitor presents the child with a toy set and comments on the toys which the child shows he recognizes by using them appropriately, such as throwing a ball, or pushing a car. She introduces one of the basic concepts of the curriculum: It is easier for a child to learn the names of objects he recognizes. The home-visitor then moves into the role of language model, a primary strategy of the curriculum. She arouses the child's interest in one of the toys he recognizes and when she has his attention she repeats the name of the object in short sentences. The speech model demonstrated at this stage of the curriculum consists of short (3-4 word) sentences, consisting of nouns, adjectives and verbs other than the verb "to be." After her demonstration, the home-visitor helps the mother to choose the names of a few other familiar objects to teach the child to understand, using the simple speech pattern just demonstrated. The second strategy of the curriculum is to create opportunities for the mother to actually use these styles modelled for her. The home-visitor encourages the mother to apply this descriptive referential speech during home-visits (with different toys and books which the home-visitor brings) and during other everyday situations (feeding, dressing, bathing) when the home-visitor is not there.

A third strategy, record-keeping, addresses itself to the problem of maternal responsiveness. The aim of this strategy is to inform the mother about her child's language development so that she can base her speech on his linguistic ability. Early in the curriculum the mother keeps simple written records of the child's responses to songs, games, books, and words she is teaching him. The home-visitor helps the mother list the child's first 50 words, which are used to determine what categories of words the child finds easiest to learn. Two excerpts from home-visitors' records illustrate the possibilities of this strategy:

> "Before we'd even begun to classify on the questionnaire the words that the child says, the mother remarked that he doesn't name things as much as he uses words for actions he does. I was pleased she could analyze his language this way. After completing the questionnaire we could see that actually his words are fairly well distributed in the different categories, but that he did have quite a few more action words than names for things."

> "Then we filled out the questionnaire about how the child expresses needs, wants, etc. It was a good game because the mother remembered a few words and expressions her child says that the mother hadn't realized. It was good for her to see this because I felt she was disappointed that her child hasn't learned new words in the last two or three weeks...sometimes I think the mother is really surprised to find out that her child knows so much."

To further inform the mother, tapes are made of the child's vocalizations to see which sounds he found easiest to make, and language comprehension probes are done by asking the child to perform small tasks. A fourth strategy is to provide the mothers with specific activities which might promote vocabulary growth. Books, puzzles, and special toys are given to the child, and a scrapbook of pictures to read to the child is made during the visits.

The Pattern of Visits Over Time

The first third of the curriculum casts the mother in an active, interest-creating role while the child is viewed as a listener and observer of his environment which his mother is describing to him. In the weeks following the first visit, the mother is encouraged to describe and name not only particular objects, but to broaden this technique to events in general so that her child may see this as a proper function of speech. Comments written by one home-visitor indicate how one mother adapted this speech style and how her child reacted:

> "The mother said her child showed interest when she used descriptive speech when playing with him. He is mostly using b, d, m, and n sounds so we will concentrate on teaching words containing these sounds. The mother did well describing what objects do when we were playing with the child. He imitates the intonations of her sentences and speaks in long strings of syllables."

Home-visitor and mother play classic rhymes, songs and games with the child; the home-visitor gives the mother a collection of rhymes (including some rhymes mothers taught the home-visitors) to further interest her in enjoying social speech with her child. A vocalization reinforcement exercise is done to illustrate to the mother how her speaking to the child increases his talking.

Tapes of mothers talking to their children are used occasionally in the curriculum. One tape of a German mother and her child talking in German is a vivid reminder of the difficulties of learning a new language. Another tape contrasts the suggested style of using concrete nouns versus vague words like "this," "that," or "it's" in talking to a child. These tape demonstrations are followed by a play session in which the home-visitor and mother apply the concept in their own conversations with the child.

Another fundamental concept the language curriculum emphasizes is the use of functional definitions in labelling objects and animals for the child. The home-visitor demonstrates with books, toys and household objects how to show and describe what things do. (This is a clock. The clock's hands go round and round.

The clock goes buzz.)

Books are introduced early in the curriculum and remain important throughout. They are presented as a way to interest the child in speaking as well as to help his understanding. Ways of attracting and holding a child's attention in books are demonstrated, such as reading with enthusiasm, asking questions and supplying the answers, making up tickling, bouncing, or animal sound games to go with the pictures. In later visits objects are matched to pictures.

As the child begins to talk more, the mother's role is changing. In the middle third of the curriculum, she and the child are both active participants in the process. Visits are now bi-monthly. A goal at this stage is to increase the mother's awareness of her child's language comprehension to help her accommodate appropriately to his ever-changing abilities. A technique used to determine how much the child understands is to have the mother give a set of simple commands in sentences of varying length. Once it is clear what length of sentence the child understands, the home-visitor suggests that mother talk in sentences somewhat longer than those, (e.g., if he responded best to "See ball" she would say "See the ball" but not "See the ball on the chair"). The home-visitor explains that this length of sentence will be simple enough for the child to understand but complex enough for him to learn more by listening. Modelling and having the mother practice this style of conversing with her child reinforces the idea.

In this middle third of the curriculum the home-visitor and mother explore the child's vocabulary and categorizations of the world. One of the child's main tasks between 18 and 24 months of age is to figure out the adult definitions of words. For example, does dog mean all four-legged creatures to him or just his own stuffed toy dog? The mother can help him expand the words he defines too narrowly and specify the words he defines too globally. The home-visitor and mother work out techniques together, using objects around the home, toys, books, the out-of-doors, etc. A gentle correcting of the child's categorization errors is advocated. If the child calls a truck a car, a helpful response would be to say "Yes, it's a kind of car called a truck." When the child shows a preference for a particular category of words, animal names, for example, the mother is encouraged to help the child expand this category.

Emphasis shifts in the last third of the curriculum, where the child is viewed as the most active participant in the language learning process. He is now talking and the mother's role is to react to what he says in ways that will foster the continued growth of vocabulary and communication ability. Visits 17-20 concentrate on improving the child's vocabulary of nouns. In the 21st through 24th visits adjectives and adverbs are stressed. The curriculum tries to help a mother and child develop conversations between them. Conversational styles are modelled in the 17th through 20th visits while Visits 21 through 24 focus on having the mother practice these styles. The excitement of this stage when the child begins to use language to communicate his feelings, thoughts, and what he sees is shared by mother, home-visitor and child. While the 50 word list helped to keep track of his object-, people- and action-names, a new type of record, the communication questionnaire, helps record the changes in the child's level of communication from gestures to one-word utterances to simple sentences to more complete sentences. Tapes of other mothers and children talking, and demonstrations by the home-visitor are models of a conversational style which encourages the child to continue talking by expanding upon his vocalizations and asking questions and elaborating upon his responses.

During this phase of the curriculum, action words are taught by having toy animals jump, run, hop, walk, etc. Color, texture, shape and size words are emphasized by the mother and home-visitor while the child plays with toy sets designed for the purpose, looks at and touches materials of different textures added to a picture scrapbook (started with the mother earlier), and manipulates play dough and finger paints. Another conversational mode that the home-visitor and mother begin to help the child develop is that of talking about the past. A technique suggested is to ask the child just after an event--a walk, a visit to a restaurant, etc.--what he did and saw. The home-visitor, mother, and child take walks together and describe to the child what he is seeing. Afterward, they talk about what they saw on the walk, using the past tense.

At the last visit the home-visitor and mother review the course of the child's language development using the Baby Book with all its forms as an aid. The tone of this reminiscence is positive about how far the child has come and how well he can communicate now. A tape is made of the child's conversations at 30 months for the mother to have as a permanent record. If the mother is expecting another child, or if one has been born during the course of the curriculum, the home-visitor brings materials to start a Baby Book for this child. This is to encourage her to follow this child's language development and to remind her of the techniques used to help the child who participated in the program to understand and use language.

The Language Curriculum--As It Was

The differences in the children's verbal comprehension and production necessitated two levels of activities in the Language Curriculum. Although the basic presentation of concepts proceeded as described in the previous section, flexibility was written into the curriculum. To some mothers the descriptive language style and the use of functional definitions in talking to their children was natural and self-evident. However, to other mothers, verbalizing to their children in simple repetitive language was so unnatural that they seemed embarrassed to talk this way. The home-visitors to the latter group of mothers helped the mothers adopt this style of talking to the children and worked on facilitating the process of interpreting the children's early sounds and signals. For example, some mothers did not believe their children were talking until they listened with the home-visitor to a tape of the child vocalizing and could recognize words the child was saying. The home-visitors to the children who were verbalizing already and/or to mothers who were already communicative to their children supplemented the basic curriculum with more advanced exercises which the rest of the group would be doing when the children were older. For example, they began using the scrapbook to extend these advanced children's word categories (if the child said the word 'dog' then one might find pictures of all varieties of dogs to put in the book and later add pictures of different four-legged animals that could be confused with a dog, to help the child learn new categories). They might be doing this, while the other group was working on the more basic concept of teaching a child an object name by showing the object's use.

The home-visitors needed to be sensitive to some subtle and not-so-subtle messages the mothers were giving. At times some mothers of children who were not speaking yet, worried that there was something wrong. The home-visitor had to reassure a mother at such times that the child would start to talk in his own good time and that children vary tremendously in the age at which they start to talk. A basic theme of the language curriculum would be reiterated: the goal is not to teach the children to talk sooner but, at this stage, to help him understand the language he hears and to show him the many uses of language.

IMPLEMENTATION OF THE SOCIAL CURRICULUM

Goal of the Curriculum

The enrichment of interpersonal connections, particularly the connection between a mother and her child, is the fundamental goal of the social curriculum. The program does not presume to create bonds but to supplement and to make more enjoyable those which already exist. It hopes to foster in the child and mother aware, open, interested, respectful and sensitive attitudes toward each other and toward other people.

The Home-Visitor's Role

The home-visitor begins the home-visiting series by establishing a friendly rapport with the mother, not as a teacher or interviewer, but as a friend and fellow investigator of child development. The role of the home-visitor is to encourage mother and child to engage in social activities together. In the first third of the curriculum, the home-visitor provides opportunities for mutual laughter, physical contact and eye-to-eye contact between mother and child: She brings ideas for new games and elaborations of old games (i.e., rhymes, finger plays, variations on peek-a-boo) with different props. Although she occasionally participates in the play times, mother and child remain the central players. The home-visitor also creates situations which are planned to foster the mother's awareness and appreciation of her child's unique qualities. She tries to demonstrate to the mother how the mother influences her child's behavior by initiating social exchanges and by responding to those initiated by the child. When mothers are concerned about specific developmental issues--When do I toilet train and how? What should I do about temper tantrums or fears?--the home-visitor assists the parents in formulating a consistent strategy by providing articles and books about the subject and providing basic developmental knowledge (e.g., when a child actually can control the sphincter muscles, how two-year-olds frequently have fears,and a list of fears common to a two-year-old is given to the mother).

The Pattern of a Typical Visit--the Strategies

A visit typically begins with a relaxed chat with the mother about the social events the child has experienced over the past week, the people the child has seen, the places he's been, the games and activities mother and child have done together. The mother keeps a simple written record of the fun social times she and the child have. The Social Diary is one way in which the curriculum emphasizes the value of these moments of social stimulation for the child. At times the mother is asked to keep other simple written records of her child's activities which tie in with the discussion topic of the week. For example, one form the mother and home visitor work on in the 2nd visit is a list of the many little ways the child imitates his parents. This exercise in observation helps to illustrate how influential the mother is in her child's life and the extent to which she serves as a model of behavior. The curriculum begins here to try to bolster the mother's self-esteem, showing her that she is a major force in her child's life and that her opinion of herself influences his opinion of himself. In the 4th visit the mother is given a developmental milestone sheet to introduce the perspective of long-term developmental changes. Asking the mother to observe her child's behavior is another strategy used by the curriculum to help her keep in tune with her child's developing abilities so that she can respond to him on an appropriate level. She is also encouraged to observe his moment-to-moment social behaviors (smiling, looking, vocalizing, touching people), to alert her to how interactions between people occur, to attune her to the wide range of pre-verbal communications a child uses at 13 months, and to the more sophisticated communication he will use later (these forms are attached). To encourage a mother to respond immediately, consistently and contingently to her child's expressive behaviors during the course of the curriculum, she is asked to observe her child's emotional expressions at different ages and under different situations. One such form "How does your child tell you that he is happy, angry, afraid, tired, sick, etc." explores how her child communicates these states. Another form in Visit #8 explores anger in the child--what provokes it and what behaviors indicate this anger and how the mother responds. These forms, with pictures of the child and family, are made into a Baby Book which provides an observation record of changes in the child's behaviors as he develops.

Following this review of the week's activities and forms completed by the mother, the topic of the current visit is introduced by a variety of techniques: the home-visitor may ask a few questions about how the child behaves in certain situations or she may show home movies of children expressing different emotions, or use articles from popular magazines and child-rearing books. During these discussions, mothers are encouraged to articulate their attitudes and goals for the social development of their child. Topics discussed include: Responding to a Child's Attempts to Communicate, Individual Differences and Cross-cultural Universals, Social Roles and Sex Identities, The Child's Widening Social World, etc.

Some excerpts from the home-visitor's "Postscripts" indicate how these techniques were applied in the visits.

> "Mrs. P. enjoyed this visit. She liked the article, 'Crying--A Child's View" and the film. She commented frequently on the differences between the three children and the different ways they express their emotions. She also compared D. to each of them."

"We talked about how F. learns about his body--finds his belly-button, tries to take off his finger, looks in mirror, points to his own features and mother's same features."

Each visit usually has a play period. Early in the curriculum the home visitor concentrates on giving the mother ideas for new games and variations on old favorites. She conveys the basic idea that a child learns and develops socially through games, that he derives happy expectations for social interaction from such play. Finger plays, songs, rhymes, books, bouncing and tickling games fill these early visits. Later visits take the form of a trip to the zoo, a farm, the park, or to visit a friend, or the home-visitor brings play dough, finger paints, books, puppets, or a doll house to give the mother new ideas for play periods. At times the activity takes the form of an observational exercise to illustrate the topic talked about or as a vehicle to get into a discussion. For example, to reinforce the idea that the mother is a "secure base" for the child to return to periodically while exploring the world, the home visitor winds up a toy clown which the child has not seen before. As it "walks" along, the home-visitor and mother talk about how her child reacts and if the child feels he can explore without contact of mother, or if he needs contact and what kind--eye-to-eye, merely, or physical touch. One excerpt from a home-visitor's "Postscripts" indicates how this went in one case:

"R. had never seen a wind-up toy before...R. looked at it cautiously, exchanging looks between Mommy and me to check to see how we liked...this new thing. He very cautiously touched the hat which somehow triggered movement. R. was frightened and, screaming, ran to Mommy. Mommy said, "How about that, I guess I still am useful."

Another exercise is designed to show the mother how effective an immediate and positive response is in reinforcing a child's behavior. A baseline tally is made of the child's vocalizations and smiles directed at his mother while she is instructed not to respond. Then a tally is taken while the mother reinforces each smile and vocalization with positive affective speech and smiling. She's encouraged to try this out over the week with two toys, reinforcing play with one and ignoring play with another. This is a strategy to (1) encourage responsiveness to the child on the mother's part and (2) teach the mother how a child's desirable social behaviors can be augmented and undesirable ones diminished by reinforcement, thus fostering the development of the mother's sense of effective control. This lesson is further expanded by helping the mother choose an appropriate social rule to teach her child using the techniques of modelling and positive reinforcement rather than directiveness or punishment.

There are "review" sessions at regular intervals in the curriculum when home-visitor and mother look back over the Baby Book to review how the child is maturing in his social behaviors. One home-visitor's "Postscripts" tell us how this sort of review went:

> "Mrs. P. has noticed many changes in D.'s behavior--most noticeable--his independence and the appearance of temper tantrums. Changes in likes and dislikes--for example, now he doesn't like 'broken' cookies."

The Pattern of the Visits Over Time

There is a spiralling of the same basic concepts throughout the curriculum, with particular emphasis on social stimulation, sensitivity to the child's messages and responsiveness to him as a uniquely valued individual with his own rate of development and ways of communicating. As these topics reappear in the curriculum, the discussions reflect developmental changes and individual differences.

The first phase of the curriculum features the mother-child dyad and the home as centers of the child's social life. Visits 1-14 emphasize the mother's importance in her child's social development. Topics in these visits include: The Value and Enjoyment of Social Games, How a Child Learns by Imitation, The Importance of the Child's Attachment to His Mother, The Importance of a Mother Observing Her Child's Behaviors. The home-visitor helps the mother to articulate the social goals the family has for the child. Maternal responsiveness to the child's signals is a core concept in the curriculum, which is discussed and encouraged specifically in Visits 7-9, 12, and 14. In this visit series the mother and home-visitor study how the child expresses his needs, desires, and emotions and how the mother communicates to him her wants and feelings. Interwoven with this theme is the theme of identity and self-concept. In Visits 10, 11, and 13 home-visitor and mother consider how a child forms a self-concept and begins to feel self-esteem. They discuss how social roles and individual differences influence a child's self-concept.

In the second phase of the curriculum activities expand outward to the child's experiences outside the home. His relationships with other people, his pro-social and anti-social behaviors, and the social rules the family begins to teach a child are the concern of Visits 15-27. At this age (18-24 months) the child is communicating more clearly and the curriculum alerts the mother to his growing need for independence and autonomy. The social curriculum has parties at holidays for the families participating in the program to provide opportunities for mothers to see their children in groups, to note differences between children, and to arrange to see one another again if they desire.

Finally, in the third phase of the visit series (24-30 months) the curriculum encourages a further expansion of the social circle. Neighbors and friends are invited to sessions and "Forming Friendships" is the topic of Visit #30. Mother and home-visitor consider future group activities for the child in the 32nd visit. Balancing the emphasis on the outer social world is a thoughtful consideration of the child's inner life. A child's fears and how parents can help a child overcome them is the topic in Visit #28, and Visit #29 deals with the development of a primitive conscience and how a child begins to learn self-control.

The Social Curriculum--As It Was

The nature of the social curriculum was such that a talk between mother and home-visitor on a particular issue suggested by the curriculum could evolve quite differently for each mother. In fact the curriculum is written to allow this flexibility--all home-visitors would be doing the same exercises, giving the same hand-outs and discussing the same general topic but how it evolved depended on the individuals involved. The curriculum suggested many possible issues in a topic. Even the same exercise could, and usually did, bring about different reactions from each child. The social curriculum emphasized this uniqueness of each individual. The postscripts illustrate how one exercise could turn out quite differently, and how the home-visitor must be adept at adjusting to all possibilities:

> "She (the mother) told me she didn't think S. thought she was special--especially since he showed little anxiety with strangers and can be left with anyone. Then I laughed and told her that I bet S. did think she was special and that I had a little experiment to see how important she really is to him. The child didn't mind when she left the room, but when she put her coat on and said goodbye he panicked--he walked toward the door and screamed. When I pretended to leave, he walked me to the door, smiled and said "bye-bye." Mommy was amazed!"

> "After a discussion of children's attachment to the people they know and trust, we tried a mini-experiment: separation reactions. The mother left the room and P. waved bye-bye and laughed. The child showed no anxiety at all--so I picked up on the point that she must

> feel very secure, that the mother's relationship with the baby is the foundation on which she will base other relationships and perhaps that's why she felt secure with me when the mother pretended to leave."

Each family had its own unique social context which necessarily influenced the development of the social curriculum. The differing contexts were events such as the birth of a sibling, a move to a new neighborhood, or visits by grandparents who live far away, and ongoing situations such as a large extended family who involved themselves in the rearing of the project child, or a nuclear family without relatives near, or an unwed mother living with her parents or a mother who changed living-partners occasionally. Although the general visit topic would usually be maintained, the individual visits reflected the varied concerns of each family for their child's social development.

Unexpected Variations, Obstacles and "Tricks of the Trade"

The curricula represented the idealized version of what a home visit should be. As any teacher knows, what actually happens out there in the "real world" is not necessarily the same as the on-paper lesson plan. (Some situations presented problems whereas others called for unexpected variations in our visit plans.) What were some of the most basic problems met in carrying out the curricula? What were some of the strategies evolved to handle these problems?

The Presence of Siblings

Quite a number of children in our study had older siblings who were young enough to feel slighted by attention paid to the "project-child." They wanted to be part of the show. We soon learned that to ignore this desire was impossible and a diplomatic blunder. Possible solutions were to arrange visits when the sibling was visiting grandparents, other relatives or friends, out with a sitter, sleeping, or with the father. When none of these was possible, the older sibling was gracefully worked into the visit by the home-visitor, who had to juggle the goals of a particular visit with the needs of the older sibling. A model of four-way play was devised in the play curriculum in order to help home-visitors with the sibling "problems." The home-visitor in this model had two options: If the sibling was inclined to be cooperative, the home-visitor could suggest to him or her elaborations the sibling could make on the "project child's" play. If this system did not work, she could involve the sibling in play while she also watched the mother's ongoing play with the "project-child." Mother and home-visitor could discuss how the two children responded to different materials and the influence of entries made into their play by adults.

The Presence of Other Visitors

Another unexpected and interesting variation on visit plans came from grandmothers and grandfathers, uncles, aunts, cousins and friends who would come to sit in on the visit, or who just happened to be there when the home-visitor arrived. Visitors participated in varying degrees: Some just watched, others questioned the visitor about the program, and others contributed to the discussions.

The Role of the Father

Father participation was welcomed and encouraged by home-visitors when the fathers were present and appeared interested. Some fathers who were unemployed or on night shifts regularly took part in the visits and did the written observational exercises with the mothers. Some fathers were rarely seen, but their presence was strongly felt through the mothers' reports of what the father felt about the program, the toys, books, and articles, and even discussions between the mother and home-visitor. Many fathers were not regularly home for the visits, but several stayed at the beginning of the family's participation to see what the program was all about and, it seemed in some cases, to make sure they approved of what was going on.

The Strategy of Involving the Mother as a Research Assistant

One of the basic purposes of four of the curricula was to involve the mother in the program by having her keep simple written records/observations about her child. To some mothers this was an enjoyable exercise; to others it was not appealing. Since it was essential to have a record which the home-visitor and mother could look back over to assess the child's developmental progress, the home-visitor encouraged the mother to keep written records. However, if the task seemed to be too much of an imposition, the home visitor would do the record with the mother during the visit and add it to the Baby Book which each curriculum (except Baby-Only) provided. Some mothers who were not record-keepers at the start became interested in the Baby Books and started to keep records later.

The Strategy of Modeling Interaction With the Child

The difference between showing a mother a technique and the mother's actually doing it herself, was felt keenly by the home-visitors. For example, the play curriculum encourages the mother to engage in reciprocal elaborative play with her child. The home-visitor models this play style and talks about it with the mothers. Some mothers declined to play with their child, saying, "I'll watch you," and other mothers who were not attuned to their child's immediate interests were directive in play with their child. An example from another curriculum of the difference between seeing and doing is the mother in the language curriculum who listened and observed the home-visitor model simple repetitive descriptive speech with the child, but could not do it herself. It may have been that some mothers felt uncomfortable (or "silly," as one mother said) talking this way to a child, or it may just be difficult, for some to imitate a speech style that seemed foreign to them. The home-visitor in the program was a diagnostician and decision maker in her own right, particularly in such cases. The philosophy of the study was to intrude on the mother's relationship with her child as lightly as possible with a non-directive but informative approach. The home-visitor needed to be sensitive to the child's needs and the mother's intentions and goals for the child.

The Length of Visits

The typical visit was expected to last about one hour; however, the home-visitors found that certain curricula and certain families required considerably longer visits. It appears that visits in the Mother-Only curriculum tended to be the longest. Also, certain families across curricula, in extending their hospitality, invited the visitors for coffee and lunch and further conversation. Most home-visitors accepted the family's hospitality whenever possible, despite the considerable pressure on them to maintain a regular schedule, assemble materials, keep records, and so forth.

Reaction of Families to the Program

The lives of many families who participated in the program were quite complicated. In some cases both parents had to spend considerable energy to feed, clothe, and shelter their children. In other cases family life was disrupted by death, illness, marital conflict, or legal entanglements. Home Visitors were extremely flexible in arranging visits--going in the evenings, on weekends, or re-arranging appointments at the last moment to adapt to changes in family plans. At the other end of the spectrum were the mothers who, for 18 months, managed to have their Home Visitor come on the same day of the week. Many mothers obviously enjoyed the contact and communication, and expressed this to their Home Visitor. Yet there were many for whom the pleasure was not obvious and still others for whom participation seemed to be difficult and even stressful at times. In spite of great variation in reactions to the program, of the 110 families who initially agreed to participate, 100 remained participants to the end. This degree of cooperation and interest suggests that the services provided by this program fulfill a community need.

Appendix B, TABLE 1

Home Visit Calendar

Visits No.	C. Age	Language	Play	Social	Baby Only	Mother Only
		$\overline{X}$ Length of Home Visits[a]				
1 - 8	(13-15)	77.9	81.5	81.5	73.6	85.6
9 - 17	(16-18)	81.3	85.4	79.9	75.0	99.2
18 - 26	(19-24)	61.9	78.3	77.4	65.0	94.1
27 - 32	(25-30)	68.9	73.3	77.7	67.6	96.2
$\overline{X}$		72.5	79.6	79.1	70.3	93.0
		% of Missed Visits				
1 - 16		16.0	13.1	19.4	7.2	13.7
17 - 32		16.9	21.6	17.4	15.3	8.7
$\overline{X}$		16.5	17.4	18.4	11.3	11.2
		$\overline{X}$ Curriculum Exposure[b]				
1 - 16		17.8	17.9	17.2	18.3	21.2
17 - 32		14.5	15.8	17.1	14.9	23.2
$\overline{X}$		16.2	16.9	17.2	16.6	22.2

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[a] in minutes; F (curriculum) = 8.3 $p < .001$

[b] in hours per 16 visits

Appendix C: The Assessment of Play

CI Summary of Laboratory Procedures
CII Variables and Measures
CIII Coding Manuals

Appendix CI: Laboratory Procedures

The data discussed in the report is based on the following episodes: (a) two periods of child play, (b) a mother-child play period, (c) a waiting room episode occurring when mother and child first arrived at the play room, and (d) a formal test session in which children were given the Bayley Scales of Mental Development (at 12, 18 and 24 months) and the Stanford-Binet Intelligence Scale (30 months).

a. Child Play Episodes

The first play episode occurred approximately 15 to 20 minutes after mother and child entered the play room and the second occurred after the formal test session, approximately one hour later. The experimenter chatted briefly with the mother, explaining to her the purpose of the observation, then set the toys out in a pre-determined display and invited the child to play with them. All children responded to this invitation within a few seconds. Each play episode began with a preliminary period of 2 (Assessment 1) to 4 (Assessment 2-4) minutes during which the experimenter chatted with the mother, followed by 8 minutes during which the experimenter unobtrusively introduced five pretend themes. With the exception of the first theme (phoning), the experimenter did not demonstrate the activity. If the child ignored the suggestion, it was repeated and the appropriate materials were placed in front of the child. The actual words used by the experimenter depended on information from the mother regarding the labels she or the child use for words such as doll, bye-bye, night-night, and who the child is most likely to talk with on the phone. The five suggestions, the time allotted to each, and the experimenter's approximate words were as follows: (a) Let daddy talk to the doll (2 min.); "The phone is ringing." (E dials and listens). "Daddy wants to talk to you. Talk to daddy (E hands child the phone). "Now daddy wants to talk to the baby. Let the baby talk to daddy,"

(b) Feed the doll (2 min.): "Baby is hungry. Feed the baby," (c) Give the doll a ride (1 min.): "Baby wants to go for a ride. Take the baby bye-bye. Bye-bye, baby," (d) Put the doll to sleep (2 min.): "Now the baby is sleepy. Put the baby night-night," and (e) Wash the doll (1 min.): "Baby is dirty. Baby needs to be washed. Wipe the baby all clean."

Different toy sets were presented in each play episode. Toy Set I (first episode) contained 14 realistic objects which tend to support the pretend play of very young children (doll, truck, crib, blanket, phone, pot, 2 plastic cups with handles, tissue, 3 spoons, 2 baby bottles). The toys in Toy Set II (second episode) were less realistic relative to those in Toy Set I, but they were roughly matched in size and shape (gingerbread man, small box, large box, rag, mod phone, strainer, 2 tubular nesting bowls, napkin, 3 sticks, 2 jars).

b. Mother-Child Play Episode

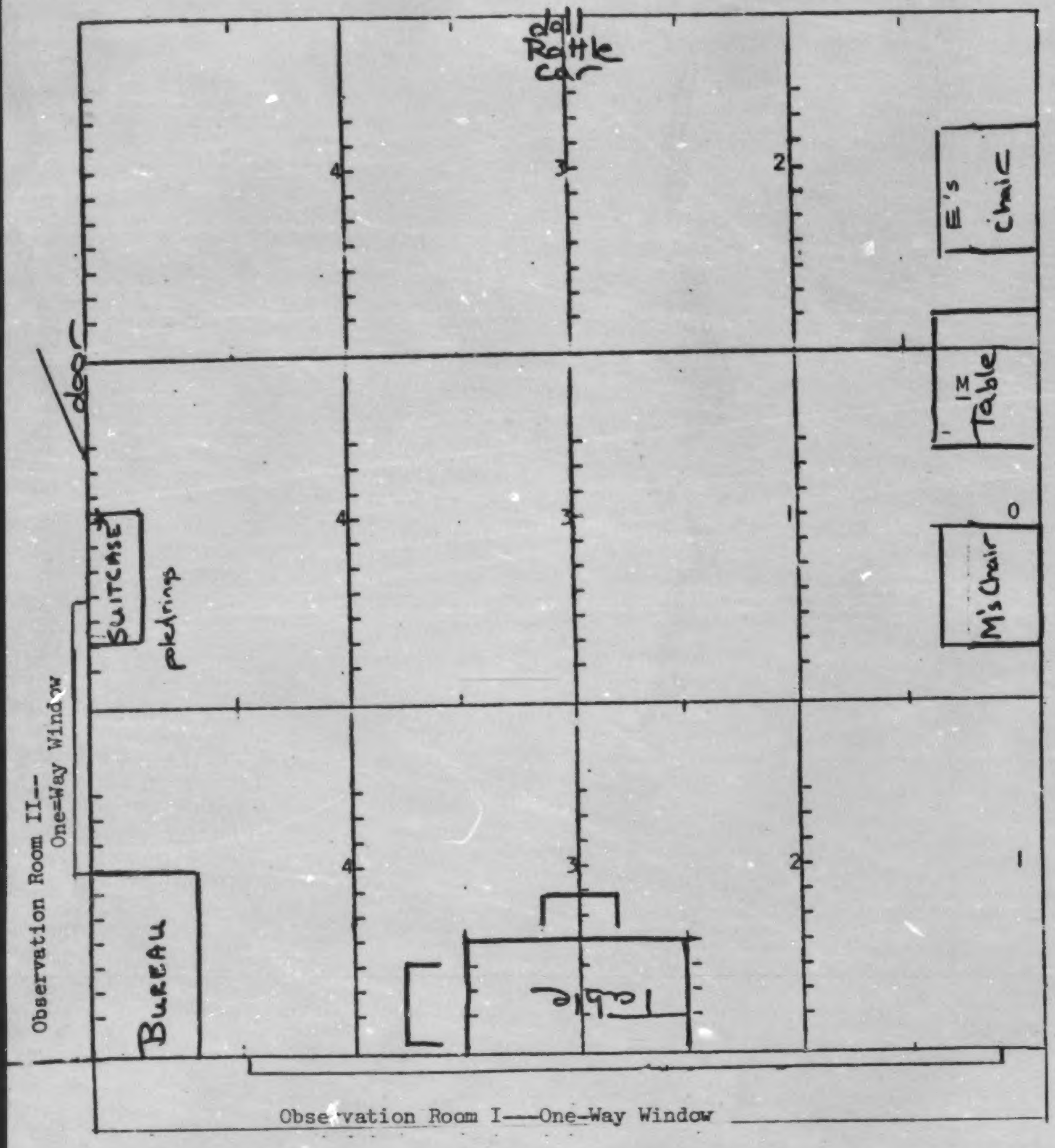
After removing the toys from the second play episode, the experimenter brought out the Mother-Child play basket. The experimenter explained to the mother that we would like to see how babies play with their mothers. The mother was invited to use the toys in the basket and to play with her baby as she would at home. The mother-child play period continued for 5 minutes on Assessment 1, 8 minutes on Assessment 2 and 4 minutes on Assessment 3 and 4. The materials were commercially available toys and household objects likely to be interesting to children within this age range. (Assessments 1 and 2: toy drum, tube, napkin box, cup, keys on a key ring, measuring spoons, bowl with cover, 6 balls, barrel of monkeys; Assessments 3 and 4: plush horse, plastic horse, pillow, 2 dolls, cup, truck, toy pliers, wrench and screw driver, cow and horse puzzle, bracelet, stack toy, 4 rectangular blocks).

c. Waiting Room Episode

The waiting room episode occurred shortly after mother and child entered the play room. The experimenter showed the mother to her seat, chatted briefly with

Diagram C.

Playroom and Waiting Room Arrangement



Appendix CII: Play Assessment Variables.

a. Children's Play Activity

Coding and Data Reduction. The coding scheme from which all play measures were derived was based on a list of approximately 50 core verbs which described specific actions ("puts into, " "fits," "bangs," "feeds"; see Table C1 for complete list). A verb was coded only when the child's activity with an object was visually directed (except for mouths), and, although non-tactual contacts were coded, they occurred relatively infrequently. A verb code was always followed by the name of the object contacted, so that the basic unit of observation was an object-action event. Within a 10-second interval, an action-object unit was coded when there was a change in either action, object, or both. An action-object unit (e.g., bangs-drum) which was sustained over adjacent 10-second intervals could be coded again, but an action-object unit sustained within a 10-second interval could only be counted once. Although action-object units were continuously sampled, the record blocked into time intervals made it possible to base measures on either time units or behavior units. For example, pretend play measures were based on behavior units--a child could be credited with more than one pretend activity within a 10-second interval. In contrast, focal object involvement was based on the number of time intervals in which the child played with his most preferred toy.

Two methods of data collection were used. Data for the four play observations (12 to 30 months) were collected by an observer stationed behind a one way viewing window, orally recording on tape the child's ongoing action-object behavior. In two additional observations (24 and 30 months) two observers (one in the playroom and one in the observation room) used an abbreviated scoring form to code a reduced number of variables (see Table C3). With the former method, the first step in data reduction occurred when the tapes were transcribed. Each verb was coded according to its membership in a broader category--a verb such as fingers designated a non-specific exploratory behavior (M1), verbs such as bangs or shakes referred to a well-defined sensory-motor action (M2), a verb such as puts into designated a simple spatial relation (M4), verbs such as feeds or stirs designated a pretend activity (P). The core verbs and coding categories are given in Table C1. The coded protocol (see Table C2) from which scores were tabulated thus contained an activity code indicating whenever an activity or object changed within a 10-sec. time interval. In addition, the different objects used within a 10-sec. time interval were listed. The final set of variables are listed in Table C3.

Observer training. Five observers collected data in the present study. Observer training involved three procedures. First, the observation language was learned and practiced by transcribing sample tapes under the supervision of an experienced observer until there was agreement between them. Second, two filmed play sequences used only for practice purposes were studied until there was agreement with a pre-standardized transcription. A second set of films (120 minutes of four episodes) was used to obtain initial reliabilities with respect to a coded standard which permitted all observers to be paired with one another. Finally, two observers tracked the play of at least two children in the laboratory behind one-way windows in separated observation rooms. Observer reliabilities for filmed and live sequences were relatively high. Post-training reliabilities were comparable to those obtained subsequently in a formal reliability check based upon 30 10 min. play episodes in which two observers were stationed in separated observation rooms with one-way viewing windows arranged so that each observer was paired with each of the others approximately three times. Estimates of observer agreement were based on the ratio of the smaller score to the larger score, averaged over 30 observer pairs. Six reliability samples were taken at Assessment 1, and 8 samples were taken at each of the remaining three assessments. A second reliability study (based on the Child Alone portion of the mother/child play episode) occurred during assessments 3 and 4 (N = 100), using a paper and pencil coding procedure and a reduced number of measures (Pretend, Level 3, Play Tempo, and Object Diversity). A third reliability check was run during the Waiting Room episode at Assessment 4, comparing two observers using oral and paper and pencil procedures. Two measures (C contact objects and Positive Affect) were derived from the same coding criteria used in the observation of play variables and involved the same observers. The following measures of style and structure were derived from the basic coding scheme. The percentage of observer agreement is given in parentheses (N = 30), for each measure, followed by reliability coefficients for those measures coded by two observers using the larger sample (N = 100).

Appendix CII -- Table C1

Children's Play Activities: Coding Categories and Core Verbs

M1--Simple exploratory object contacts (general exploration, reference, search)

Verbs: touches, fingers, points, places/drops (intentional release), searches for, picks up, M1 other

M2--Differentiated displacements of single object

Verbs: pokes, presses (full hand), pats/strokes, CDWO (turns over) circular displacement of whole object, twists, squeezes, shakes, waves, ONA (noise activities such as scratches), flings, topples, (knocks over), bangs (not 2 objects-bangs on floor), pushes, pulls, straightens, crumples, lifts, bunching-pulling things to him, M2 other

M3--Part whole relations-manipulation of a part of an object

Verbs: CDPO, DPO (wind up, turn on TV, etc.), Part-part (creates a part from a whole), opens, closes, presses (with a finger), turns (page), put in, take off or out, involving a body part (hand in cup, ring off finger), rips, breaks, M3 other

M4--Simple two-object combinations involving spatial relations

Verbs: puts on, puts in*, takes off, takes out, dumps out, pushes off*, touches to, draws, bangs-2 objects, one on other, M4 other.
*Prepositions which imply different relationships between objects can be used with core verbs, e.g., under, off, through, in, on, next to.

CR--Relational activities involving two object combinations which consider dimensions such as shape or color, or which produce configurations such as a row or tower.

Verbs: fits (as in fitting a puzzle piece in hole), lines up, sorts, matches (two blocks of same color, size, etc.), connects (as in pop-beads, rings on pole), disconnects, CR other.

SOA--Social object actions in which an object mediates a social exchange

Verbs: gives, takes, shows, offers, throws (to), request help with object., SOA other.

P1P2-Pretend

Verbs: affection, stir, pour, other cook, scoop, feed, sleep, groom, dress, drive with sound, P other. P1 involves 1 object, P2 involves 2 objects.

MB---Mouthing

Verbs: blowing, mouthing, any activity involving contact with mouth (if not coded as Pretend)

WB---Gross motor activity

Verbs: climbing up, down, riding (bike), kicking, stepping on object.

Appendix CII   Table C2

Children's Play Activity and Coding Form

Name____________________ Wave/Test #______________ Date______________
Age_________ Toys______________ Tester______________ Observer______-______
Transcriber____________

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
0																														
1																														
2																														
3																														
4																														
S																														
+																														
+																														
M1																														
M2																														
M3																														
M4																														
CR																														
P1																														
P1																														
P2																														
P2																														
MB																														
OB																														
+																														
--																														
LKS																														
VOC																														

Pre #					
Desc #					
#					
#					
#					
#					
#					
#					
other					
obj. #					
List #					
Int. #					
#					
#					
#					

Appendix CII

Table C3

Play Variables, Inter-observer Reliabilities, and Transsituational Reliabilities

Play Activity Variables	Mean Inter-Observer Reliability[b]	Mean Trans-situational Stability Coefficients
Structural Variables:[a]		
1. Level 1 -- activities such as pushing, shaking, mouthing, banging, performed on one object: Level 1 = Acc+ M1 + M2 + M0.	86%	r =.40
2. Level 2 -- activities in which either objects are brought into spatial proximity with one another (M4-spoon is put into or next to a cup, the pot is put into the truck) or a part of an object is moved (M3-the wheel of the truck or the dial of the phone is turned): Level 2 = M3 + M4.	87%	r =.38
3. Level 3 -- activities in which two objects are brought into relation with one another according to a common perceptual feature (R-the handle of the spoon is fitted between the bars of the crib, two bottles are placed next to one another): Level 3=CR.	82% (r=.89)	r =.41
4. Pretend -- activities which (a) involve treating something inanimate as though it were animate (b) resemble ordinary everyday activities but occur in the absence of necessary materials (drinking from an empty bottle), (c) are not carried through to their usual outcome (putting		

Play Activity Variables	Mean Inter-Observer Reliability	Mean Trans-situational Stability Coefficients
on a hat, but not going outdoors; closing eyes, but not sleeping), or (d) are typically performed by someone else (dialing a phone, brushing hair): Pretend - P1 + P2.	88% (*r*=.89)	*r* = .39
5. Social object activities--activities in which an object is used in a social gesture (offering, showing) or in a social exchange (giving, taking): SOA - No. 5.	85%	*r* =.39
Style Variables:^{d}		
1. Rate of Activity-Object change -- The number of activity-object unit changes per 10-sec. interval: No. A-O per 10 sec. interval.	96% (*r*=.94)	*r* =.48
2. Object Diversity -- the number of different objects contacted over an observation period: Diff. objects/Total No. Activities	92% (*r*.=.93)	*r* =.37
3. Focussed Object Involvement (1 and 2)--the time (in 10-sec. intervals) spent with the most frequently contacted object (FOI(1) and the second most frequently contacted object (FOI(2)).	93% 95%	*r* = *r* =
4. % Executive Failures--the proportion of activities in which the child had difficulty carrying out an initiated activity, either because of sensory-motor awkwardness (trying to put a spoon in a cup but the cup tips) or a misjudgment regarding the		

Play Activity Variables	Mean Inter-Observer Reliability	Mean Trans-situational Stability Coefficients
nature of the materials (trying to put a spoon in the solid end of a bottle).	81%	r =
5. Positive affect -- time (in 10-sec. intervals) spent smiling or laughing.	92%	
6. Negative affect -- time (in 10-sec. intervals) spent fussing or crying: Neg. affect/No. 10-sec. intervals	95%	
7. Looks at Mother -- time (in 10-sec. intervals) spent looking at mother.	87%	

---

[a] In the final analyses, structural variables were divided by the duration (in 10-sec. intervals) of the observation period. In order to examine the developmental aspects of change in structured measures, additional analyses were performed on proportions (structural variable/Total Number of Activities).

[b] Mean % observer agreement (N = 30) is given first and reliability coefficients (N = 100) are given second when available.

[c] The transsituational stability coefficients are based on two 10 minute play episodes and averaged over four assessments. For structural variables they are calculated from frequencies divided by duration.

[d] In the final analysis, style variables 1-7 were divided by the duration of the observation period; object diversity was divided by the Total # Activities.

b. Mothers' Play Entries

A mother's play entry was coded whenever a mother handled an object with some gesture indicating an attempt to attract the child's interest. Some mothers played with the toys themselves (often with their backs to the child), whereas others collected scattered toys and simply placed them within the child's reach. In neither case would the mother's behavior be scored as a play entry. Maternal behaviors were continuously recorded on a form (Table C4) listing five types of maternal play entries based on the mother's choice of object and activity (elaborative, unrelated, helping, imitative and reciprocal), verbal suggestion (with or without object), and the child's acceptance or rejection of mother's proposal. In addition, during Assessment 3 and 4, the mother's object choice and whether her entry involved a pretend or level 3 activity was coded. Reliabilities are based on two sources. For 30 observations, two observers coded maternal behaviors from behind a one-way window. For an additional 76 observations one observer was located in the observation room, and the other was located on the far side of the playroom facing the observation room. Interobserver reliabilities are given as percentage of observer agreement (N = 30) and as reliability coefficients (N = 76).

1. _Elaborative_ (E) _entries_ referred to those in which either the mother's choice of object, or her choice of activity matched the child's activity.

2. _Unrelated_ _entries_ (U) were those in which the mother varied both activity and object.

3. _Helping_ _entries_ (H) were those in which the mother's suggestion involved neither a change in activity or object (e.g., when the mother steadied a toy, or handed the child another block, or part of a toy to maintain this ongoing activity.

4. Imitative and reciprocal (IR) activities were those in which the mother either repeated what the child had done (without changing object or activity) or in which the mother repeated an interactive activity (e.g., child rolls peg to mother, mother rolls peg back to child).

Appendix CII

Table C4

Mother's Play Entries: Coding Form

Wave______ Ass. #______ Child______

Date______ Scorer______

Toy P	Type R	Toy Name	Un	N	El	I	R	Comment
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	
			VXRP+-	VXRP+-	VXRP+-	VXRP+-	VXRP+-	

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Table C5

Mother's Play Entries: Variables and Reliabilities

Variables	Observer Agreement (N = 30)	r-Coefficients (N = 76)
M's Elaborative Play Index		
(E = H) - (U)/TMA	91%	.95
M's Play Entries		
E + H + U + IR/TMA	89%	.82
M's Vocal Suggestions		
M-Voc/Time	84%	.85

c. Behavior in the Waiting Room Episode

In studies of social development, a child's proximity to the mother is assumed to reflect his attachment to her, smiling and vocalizing are considered contact maintaining behaviors which reflect a more mature form of attachment, whereas the extent to which play is disrupted indexes a child's response to stress producing situations (cf. Goldberg & Lewis, 1968; Ainsworth & Bell, 1970; Maccoby & Feldman, 1972). Presumably, patterns of the above variables reflect the ways mothers and children manage stressful encounters in unfamiliar places with unfamiliar people. In the waiting room episodes observers stationed behind a one-way viewing window coded the following behaviors every 10 sec. on a pre-established form (Table C5): The child's (a) location (CX), (b) physical contact with the mother (CP), (c) positive affect (C+), (d) vocalization (CV), (e) toy contacts (CO), and the mother's (f) location (MX), (g) smiles (M+), (h) vocs (MV), and (i) toy contacts (MO).

The playroom was divided into 12 equal blocks (4 ft. x 3 ft. each), numbered 0 - 4 according to their distance from the mother's chair. Position and toy contact (mother and child) were recorded every 10 sec. at the sound of the "beep." The remaining behaviors were coded as they occurred but no more than once every 10 sec. A physical contact was scored if the child made body contact with the mother, a toy contact was scored if a toy was held or manipulated with visual attention. Since most mothers remained seated during the entire waiting room sequence, the mother's position score showed relatively little variation. In addition, the distribution for physical contacts was skewed (as many as 50% of the children on a given assessment might not make body contact with the mother). The final distance score, which took into account times when the mother was not in 0 position and the child's physical contact, was calculated as the absolute distance between mother and child minus physical contact. The measure of the child's expressive behavior-combined vocalizations and smiles (on any given assessment 40% to 50% of the children might not smile at all) divided by the distance between mother and child, thus reducing to some extent, the relation between spatial location and the use of distal behaviors. Also, mothers vocalized and contacted toys infrequently (smiles was unreliable and thus dropped); these measures were combined to provide an over-all index of the mother's contacts with the child during the observation period. The final list of variables is shown in Table C6. Observer reliabilities are based on two sources: (a) a sample of 30 jointly observed episodes in which each of the five observers was paired with the others over 3 cycles distributed over assessments, and (b) a sample of 76 children on Assessment 2 (Episode 2, in which one observer was in the play room and the other was behind the one-way window). Observer agreement for the sample of 30 is based on the smaller score divided by the larger score, averaged over observer pairs. Reliability coefficients are used for the larger sample (see Table C7).

Appendix CII

Table C6

Waiting Room Scoring Form

Name____________________

Date____________________

Rep. # ______________

Asses. # ______________

C	M		C	M		C	M		C	M	
X+VPO12L	X+VO12	4	X+VPO12L	X+VO12	3	X+VPO12L	X+VO12	2	X+VPO12L	X+VO12	1
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	

C	M		C	M		C	M		C	M	
X+VPO12L	X+VO12	4	X+VPO12L	X+VO12	3	X+VPO12L	X+VO12	1	X+VPO12L	X+VO12	0
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	

C	M		C	M		C	M		C	M	
X+VPO12L	X+VO12	4	X+VPO12L	X+VO12	3	X+VPO12L	X+VO12	2	X+VPO12L	X+VO12	1
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	
X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12		X+VPO12L	X+VO12	

	C								M						
	X	+	V	P	O	1	2	L	X	+	V	O	1	2	
0															
1															
2															
3															
4															
T.															

Code

X location of M and C
+ smiling
V vocalizing
O contacting object
P contacting person
L looks
F-L = 1
U-H + 2

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Appendix CII Table C7

Waiting Room: Variables and Reliabilities

Variables	Inter-Observer Reliability	
	N = 30	N = 76
1. M/C Distance		
(CX-MX/#10 sec.) - (P/#10 sec.)	98%	*r* = .92
2. C - Toy Contact		
(# 10 sec. intervals)	96%	*r* = .90
3. Expressive Behavior		
(Smiles + Voc/M/C Distance)	86%	*r* = .84
4. Mother Involvement		
(MO = MV/#10 sec.)	85%	*r* = .85

Appendix D: The Assessment of Language

DI	Summary of Assessments 1 - 4
DII	Language Methods and Variables
DIII	Coding Forms and Test Instruments

Appendix DI. Language Assessment Procedures

The child's language production, comprehension and categorization skills, and the mother's speech, teaching style and attitudes toward language and education were assessed in a variety of situations at each assessment. Assessments took place in the home and lasted 1 to 1-1/2 hours. Each session was preceded by a 50 to 10 minute chat with the mother, during which time the observer briefly described each task.

The exact order of presentation for each of the above measures is given below. This order was designed to maintain the child's interest throughout 1-1/2 hours of testing. Thus specific tests (Comprehension, the Palmer) were interspersed with periods during which the child could play with toys as he wished. Periods of adult interaction (mother-child play, observer-child play) were interspersed with opportunities for the child to play alone. In most cases it was possible to keep the child happily involved in the proceedings for the entire visit.

The order of presentation mentions several tests not described in detail. These tests were not included in the final analysis either because they were very unreliable, or because they were replaced with similar measures that appeared to have better validity.

Assessment 1: (1) Initial interview of M. C's speech taped during the first 5 minutes of interview, (2) Schema development test, (3) Comprehension I administered by M and O. One-half children receive order M-O and the other half receive order O-M, (4) Maternal and child speech taped as M showed suitcase of toys to C-10 minutes, (5) Attitude inventory: C taped during 5 minutes of maternal attitude inventory, (6) Maternal and child speech - M read book to C - 5 minutes.

Assessment 2: (1) Toy choice, (2) Maternal and child speech: *M* showed book to *C* - 5 minutes, (3) Comprehension Test, (4) Vocabulary record: *C*'s speech taped - 10 minutes, (5) Mother and child speech: Speech taped as *M* showed *C* the following sets of toys in the order indicated: dressing toys (4 min.), newspaper (4 min.), replica toys (5 min.), block and pail (4 min.), (6) Peabody Picture Vocabulary Test (*M*).

Assessment 3: (1) *C*'s speech with stranger: *O* played with *C* for 10 minutes using Stranger toy set, (2) Comprehension IV, (3) *C*'s speech alone: *C* played with Stranger toys - 10 minutes, (4) Maternal and child speech: *M* showed *C* Maternal toy set, (5) Palmer Concept Inventory.

Assessment 4: (1) Maternal and child speech: taped for 10 minutes as *M* showed pretend toys to *C*, (2) Palmer Concept Inventory, (3) WISC-Picture Completion, (4) *C*'s information giving speech: *C*'s speech taped while explaining to *M* how viewer works - 5 minutes, (5) C's social speech taped as *O* showed book to *C* - 5 minutes, (6) Comprehension IV.

Appendix DII. Language Methods and Variables

Language Production

Recording System. Several portions of each assessment were taped on a portable cassette recorder. The tapes were used to assess the level of children's language production. At Assessments 1, 2, and 3, the taped portions also provided information on the effects of context on children's speech (not included in this report). Children's language was taped while they played with an adult and while they played alone. In Assessment 3, children's language was also taped while they played with a stranger.

The following portions of each assessment were taped:

Assessment 1:

1) Observer gives mother an initial interview to collect demographic information. 5 minutes.

2) Observer gives mother an attitude inventory which samples her attitude toward language development (data from this inventory are not included in this report). 5 minutes.

3) At observer's request, mother shows child a standard set of toys. 10 minutes. The toys included container and objects to be contained, dolls, cars, a form board, a ball and a mirror. During this segment the observer was not interacting with mother or child. She was therefore able to make a written record of the child's speech in addition to the tape recording.

Assessment 2:

1) Observer helps mother complete a vocabulary checklist (see below). 5 minutes.

2) At observer's request, mother shows child four sets of toys, administered consecutively for 4 minutes each. 16 minutes.

The first set included dress-up toys such as hats, adult shoes, and an Indian costume. The second set provided objects for symbolic play: miniature tools, doll furniture, dolls, miniature plastic fruit. The third set was a newspaper and the fourth blocks and a pail. These sets provided an opportunity to sample maternal language in different situations (situational contrasts are not included in this report). During this segment the observer made a written record of the child's language in addition to the tape recording.

Assessment 3:

1) Observer shows the child a set of toys matched in type and quantity to those described in Assessment 1. 10 minutes.

2) Child plays alone with these toys. 10 minutes. The mother was asked not to initiate any interaction during this sequence.

3) At the observer's request, the mother shows her child a standard set of toys, matched in type and quantity to those described in Assessment 1. 10 minutes. During segments 2 and 3, the observer was able to keep a written record of the child's speech in addition to the tape recording.

Assessment 4:

1) At observer's request, mother shows child a set of toys, matched in type and quantity to those described in Assessment 1. 10 minutes.

2) The observer shows the child a toy slide viewer. When the child learns to operate the viewer, the observer asks the child to show the viewer to his mother. 5 minutes of the explanation are taped. (This segment assessed the child's ability to communicate; analysis of communication ability has not been completed). During both of these segments, mother-child play and the viewer explanation, the observer kept a written record of the child's speech.

Classification System. At the completion of each assessment, the observer transcribed her tape of the child's speech. When, in addition to the tape, a written record was available, the observer checked the written record against the tape transcript and corrected the latter wherever necessary. The observer separated the transcript into utterances. An utterance was defined as any speech sound which occurs between rising and falling contours (interobserver agreement on the number of utterances was .95). The observer classified utterances as:

1. Intelligible: utterances which contain a word (or words) or a placeholder and a word (or words).
    - a. Word: any sound used consistently to refer to an object, action or attribute of an object, or, a standard English word. Words included baby-talk such as "ba" for bottle, or "tick-tock" for clock.
    - b. Placeholder: an utterance of one or two syllables, occuring before, after, or between words, which has the intonation of the missing word(s). This category applies only to the language of children who produce some multi-word utterances (see Bloom, 1970, for a more complete discussion of the use of placeholders such as "schwa").
2. Unintelligible:
    - a. Jargon: utterances of three or more syllables which are not words but which have a sentence-like intonation.
    - b. Vocalizations: utterances which are neither words, jargon, or placeholders.

Observers agreed in 98% of all cases on whether an utterance was intelligible or unintelligible. 95% agreement was obtained on classifying utterances as vocalizations or jargon.

As noted above, during some portion of each assessment visit, the observer was able to keep a written record of the child's language. As she made this record, the observer also classified each intelligible utterance into one of the following categories:

1. Interjection: A one or two word utterance expressing an emotion or a greeting. For example: "Oh, boy," "Ouch," "Goddy," "Hi."
2. Description: An utterance describing an object or action. "See ball," "Kitty," "That's a red balloon."
3. Demands object/action: An utterance which requests some object or action from another person, e.g., "Gimme that," "I want juice." Distinctions between this category and category 2 depended on context. "Ball" was descriptive when the child picked up a ball but was a demand when he wanted his sister to give him the ball.
4. Demands information: An utterance which asks a question, e.g., "Ball?" "What's that?"
5. Refusal: The child refuses a real or implied request from his mother, e.g., Mother: "Put that down." Child: "No."
6. Imitation: An exact or approximate repetition of someone else's previous utterance. For example: Mother: "That goes right here." Child: "Here."

These categories were mutually exclusive. In addition, each utterance could be classified as:

7. Answer: A response to a previous question or request.

Interobserver agreement on these categories averaged 97%.

Measures of Language Production.

1. The proportion of words: Number of words/number of utterances where the number of utterances includes both intelligible and unintelligible utterances.

The porportion of words provided a single measure of the child's level of language production from one to two and a half years. Language acquisition in this age range can be divided roughly into two phases. During the first phase, usually lasting from 12 to 20 months, the average child acquires a vocabulary of from 25 to 100 words. During the second phase, usually lasting from 20 months to 3 years, the child acquires syntax: he learns to combine words into sentences.

The proportion of words provided an index of the child's linguistic progress during both these phases. At 12 and 18 months, most of the children's utterances were either single words or were unintelligible. Few children produced multi-word combinations before 24 months. Thus, at the first and second assessments, the proportion of words varied with the ratio between the number of intelligible words and the number of unintelligible utterances. It was assumed to reflect the extent to which the child had acquired a vocabulary of words to replace the unintelligible utterances of infancy (data from a previous study showed a high positive correlation between the proportion of words and the number of words in the child's vocabulary).

At the third and fourth assessments most children had begun to produce multi-word combinations: they used very few unintelligible utterances. The proportion of words now depended upon the number of words per utterance. It varied with the ratio between the total number of words and the number of (largely intelligible) utterances. As has been reported elsewhere (Brown, 1973), the number of words per intelligible utterance provides an index of the child's acquisition of syntax.

2. The number of utterances per minute: Number of utterances/number of minutes.

The number of utterances per minute is positively correlated with the level of children's language production (Nelson, 1973). Thus, to some extent, this measure, like the proportion of words, assessed linguistic ability. The number of utterances per minute was also assumed to measure the child's efforts to communicate in spite of limited linguistic ability. Children with a high number of utterances per minute try to talk although they experience considerable difficulty in making themselves understood.

The following measures of language usage were converted to percents because of high variability in the total number of utterances:

3. Percent description: Number of descriptive utterances/ number of utterances.

The ability to use language descriptively is an essential communicative skill. In order to communicate ideas, the speaker must be able to accurately describe actions, objects, and the relations between objects or actions and objects. Between one and two and a half descriptive language is, of course, very primitive. The child usually only names an object or describes it; only at two and a half does he begin to relate two objects or an object and an action. However, we assumed that the ability to label objects and their attributes was the forerunner of true descriptive speech.

4. Percent demand: Number of demand object/action/number of utteranc

Demand speech represents the other side of the coin from descriptive language. Descriptive language deals with the world objectively; demand speech communicates the speaker's wants and needs. The child needs to acquire demand speech, for adult language is used to obtain fulfillment from others as well as to describe the world. Again, demand speech between one and two and a half is primitive. The child generally combines one key demand word ("more" or "want") with the object or action desired. We assumed that the use of these standard phrases represented the early stage of demand speech.

5. Percent questions: Number of demand information/number of utterances.

6. Percent answers: Number of answers/number of utterances.

Questions and answers are conversational skills. Their presence in language signals that the child is trying to use language to converse with someone, not merely to describe objects or to obtain fulfillment of his desires. Language with questions and answers sounds like a dialogue rather than a monologue. It is perhaps for this reason that questions and answers appear relatively late in the course of language acquisition. Questions and answers become frequent only when the child acquires a rudimentary vocabulary and syntax which allows him to converse with someone else.

7. Percent interjections: Number of interjections/number of utterances.

Interjections are a feature of any adult conversation: greetings and exclamations occur regularly in informal settings. Yet interjections, when compared to descriptive or demand phrases are seen to have little content. They express only global stereotyped emotions. A high frequency of interjections would suggest that the speaker is not using language to inform his listeners effectively.

Vocabulary. The type of vocabulary acquired by each child was assessed at 18, 24, and 30 months. No assessment was made at 12 months; at that age most children had fewer than five words in their vocabularies and the reference of those words was very vague.

Assessment 2: As noted above, a 20 minute sample of children's speech was obtained at Assessment 2. However, this sample was too small to permit an accurate analysis of vocabulary type; at 18 months the average child produces only 10 words in 20 minutes. To acquire a larger sample, the mother was given a list of children's early words (compiled on the basis of reasearch by Nelson, 1973). The observer asked the mother to check those words which were in her child's vocabulary. The mother was allowed to add additional words, particularly people's names.

Assessment 3 and 4: By 24 months most children produced close to 100 words in a twenty minute sample. The vocabulary analyses at the 3rd and 4th assessments were based on the tape recorded portion of the assessment visit.

Categories. The vocabulary words from the checklist or the tapes were assigned to one of the following four categories on the basis of content or reference. For a fuller discussion of these categories see Nelson (1973).

I. Nominalizations
   A. Specific--Words referring to one instance of a category, e.g., Mommy, Rover, and any label the child uses to refer exclusively to himself (John, I, me, etc.).
   B. General--Words referring to all members of a category, including: Objects, e.g., ball, car; Substances, e.g., milk, snow; Animals and People, e.g., doggie, girl; Letters and Numbers, e.g., "E," "2"; Abstractions, e.g., God, shape; Pronouns, e.g., he you, it, that, these.
II. Modifiers
   A. Attributes--more or less permanent properties of objects or persons, e.g., big, red, pretty.
   B. States--a temporary property, a state, e.g., hot, dirty, all gone, another, lots, more, etc.
   C. Locatives--any word used to indicate position in space or relative location, e.g., there, outside, in, under, etc.
   D. Possessives--any word used to indicate possession, e.g., mine, Mommy('s), my, etc.
III. Actions
   A. Descriptive--any word that describes an action, e.g., go, jump, open, crash.

B. Demand--any word that demands that an action be performed. It may be addressed to a person or to an uncooperative object, e.g., open, up, out, help, etc.

C. Notice--any word that indicates that the child has noticed something or would like others to notice something, e.g., see, look, hi, here (as in "here take this" or "look here, Mommy").

IV. Other

Vocabulary Measures.

1. Percentage of nominals: Number of nominals/number of words.

A majority of early vocabulary words are nominals, and a very high percentage of nominals in early speech seems to be characteristic of children who acquire a large and varied vocabulary by two and a half (Nelson, 1973; Starr, in press).

2. Percentage of modifiers: Number of modifiers/number of words.

Unlike nominals, modifiers are rare in early vocabulary records. Although 12-and 18-month-olds occasionally say "big" or "more," most descriptive terms are absent from their vocabularies. By 36 months, however, intelligence tests include items which test the child's ability to describe colors and shapes; just as a high proportion of nominals in early language presages good vocabulary development, so a high proportion of modifiers in later speech seems indicative of later verbal ability.

3. Percentage of actions: Number of actions/number of words.

Action words, like modifiers, account for only a small proportion of early vocabulary. However, action words must become more frequent if sentences are to become more complex; growth in the proportion of action words would appear to be required when the child begins to produce long sentences.

Comprehension

Tests. A comprehension test was included in each assessment. The items in these tests varied with the age of the child; any test which included items suitable to the comprehension level of 12, 18, 24 and 30 month olds would have been far too long for the children's short attention spans. All tests, however, followed the same format. The observer gave the mother a set of flash cards, and asked her to read them, one at a time, to the child. If the child did not respond to the instruction on the card, the mother was allowed to repeat the item three times before proceeding to the next card. The child was given a standard set of toys containing all the objects mentioned in his mother's instructions. After a break of five minutes, the mother was given a second set of cards and the child another set of toys. Theprocedure was then repeated.

The child received one point for a partially correct response and two points for a completely correct response. A response was scored partially correct when the child touched one of the objects, or performed one of the actions mentioned. For example, if the instruction was "Put the ball on the table," a child's response was partially correct if he picked up the ball, put a cup on the table or merely touched the table. An item was completely correct only if the child performed all the actions requested.

To reflect increases in comprehension ability with age, each child's score on each test was increased by the number of points possible on all previous tests. Thus, for example, all scores on the Assessment 2 test were increased by the 32 points possible on the Assessment 1 test.

Items. The items were designed to be of moderate difficulty for the age of the children tested.

1. Assessment 1: The items contained four words. They used common verbs and nouns and asked the child to perform one action with one object. To increase the difficulty of this test, the mother, on half the items, touched

the objects she mentioned.

2. Assessment 2: The items contained three words. They required the child to relate two objects or to select between a class of objects on the basis of a single attribute. For example, the child was asked to put a book on the table, and to give the large car to his mother.

3. Assessment 3 and 4: The same test given at Assessment 3 was repeated at Assessment 4. The items contained from nine to twelve words. The child was asked to combine two or three objects or to select a single object on the basis of more than one attribute. For example, the child was asked to put the book, car, and dog on the table, and to give his mother the large, pretty, blue cup. Some of the items on this test used independent, embedded or dependent clauses.

The Assessment 2, 3 and 4 tests were designed to provide information on the relationship between comprehension and language production. The items on the Assessment 2 test described some of the relationships frequently communicated by children's early sentences. For example, some items described an attributive relationship, "Give more ball" or "Give big car." Other items described a possessive relationship, "Give Mommy's purse," (for a further description of these relationships, see Brown 1973). We wished to compare the ease with which these various relationships were understood at 18 months, and the frequency with which they appeared in the sentences of two-year-olds.

At Assessment 3 and 4 some sentences had complicated structures; they used embedded, dependent, or independent clauses. Others, matched in length, used additional nouns, verbs or adjectives. We wished to relate performance on items with difficult vocabulary or difficult syntax to measures of children's vocabulary and syntax at 30 months. Results from these analyses are not included in this report.

Maternal Speech

As described earlier (see Language Production: Recording System), at some point in each assessment the mother, at the observer's request, showed her child a standard set of toys. Mothers were aware that this portion of the visit was taped, but they were not told that their own speech was of any interest. Maternal speech directed toward the child during this segment was transcribed by a trained typist. The typist divided the transcript into utterances according to voice contours (any pause in the flow of discourse was interpreted as the end of an utterance). The observer subsequently assigned each utterance to one of the following categories.

1. Directive speech: utterances which direct the child to do (or not to do) something. This category includes any utterance which states or strongly implies that the child should take some action. For example, "Put that down," "Don't do that," or "let's go into the living room."
2. Describing people: utterances which describe people other than the child. This category includes any utterance in which a proper noun or a personal pronoun is the subject, unless that noun or pronoun refers only to the child. For example: "I'm going to the store," "Daddy's coming home," and "We're going for a walk."
3. Describing things: utterances which describe animate or inanimate objects. This category includes any utterance, in which a proper noun, or a personal pronoun, is not the real or implied subject. For example: "The truck is over there," "It's raining," "Dinner is ready."
4. Describing the child: utterances which describe the child's needs, wants, or activities. This category includes utterances which have the child as the real or implied subject. For example: "You're hungry," "You can have it," "That's right (of you)."

5. Interjections: utterances which communicate emotions or greetings in less than three words. For example: "Oh," "Ouch," "Good," "Hi."

6. Questions: utterances which pose a question. This category includes both yes/no and Wh questions. For example: "Who's that?" "Can I have it?"

Categories 1-5 were mutually exclusive, but utterances classified in these categories could also be scored in Category 6.

We assumed that each of these types of speech encouraged the child to produce a similar type of language. Thus, highly directive speech taught the child how to express his own demands through language, while speech which described things taught him to use language to describe the object world. We fu-ther assumed that certain types of speech were particularly beneficial at certain stages of linguistic development. As mentioned earlier, names for objects predominate in initial vocabularies. Thus, language describing things will be easiest for the child to understand, and will provide the greatest source of vocabulary words in the early stages of language acquisition. Language about people, and about the child's feelings will be more difficult for the child to comprehend at first; it will be better suited to the linguistic ability of a two and a half year old than to an 18 month old. Finally, we assumed that questions reflect the mother's interest in communicating with her child. A large number of questions in maternal speech was assumed to indicate that the mother was interested in what her child thought and in what he had to say.

Each of the above 6 measures was converted to a percentage for final analysis because of wide variability in the total number of utterances. Two other measures of maternal speech were also used:

1. Noun/verb diversity: Number of different nouns and verbs/total nouns and verbs.

Originally a similar type/token ratio was constructed for each part of speech; however, with the exception of nouns and verbs, these ratios were unreliable. The noun/verb diversity measure was used to assess the variety of vocabulary the mother's speech provided.

2. Percent complete sentences: Number of grammatically correct sentences/ number of utterances.

Grammatically correct sentences were those utterances which contained all of the words and inflexions required by English grammar. For example, "Do you want a cookie?" is grammatically correct, but "Want a cookie?" is not. The percentage of complete sentences measured the degree to which maternal speech provided the child with an accurate model of Standard English.

Palmer Concept Familiarity Inventory

The Palmer Concept Familiarity Inventory (1973) for two year olds was administered at Assessments 3 and 4. The original inventory contains 40 items. 26 randomly chosen items were eliminated at Assessment 3 and 11 at Assessment 4 because of time limitations.

The Palmer measures the child's grasp of a number of concepts "relating the world to himself, and things to other things," (PCFI, pg. 13). Each item presents the child with a pair of very similar objects which differ in, for example, either size, shape or color. The observer then aks the child to point to one of the pair. For example, on one item the observer shows the child a black and a white horse, and asks him to show her the white horse. On another item, the observer puts a car on and under a bridge and asks the child to indicate the car under the bridge. The Palmer is a vocabulary test which assesses the child's ability to understand words which are commonly used to describe the attributes of objects.

The following items were used Assessments 3 and 4:

Assessment 3 (14 items) -- big (horses), into (box and blocks), under (hat and plane), on top of (horse and fence), soft (block and felt), open (two containers and tops), wet (2 sponges, one wet), heavy (bean bags), out of (box and blocks), hard (block and felt), closed (2 containers and tops), dry (2 sponges), on top of (favored object and table), not heavy (box with rock and empty box).

Assessment 4 (29 items) -- all of the above plus into (box and small animals), up (doll), closed (puppets), biggest (3 plastic cups), short (2 trains), black (horse), next to (horse and cowboys). not move (2 sparklers), heavy (bean bags), forward (doll), around (box and dog), long (cylinders), empty (jar and beads), little (horse), smooth (sand paper and smooth paper), top, side, bottom (truck), dirty (2 napkins), one (block with dots), far away (horse and cowboys), light (bean bag), backward (doll), down (doll), over (wood and dog).

Transsituational and Temporal Stabilities

As indicated earlier, scores used in the final analysis of child speech were averaged over different situations in order to obtain a reduced set of measures which were not bound to one or another particular situation. It is apparent from Table 1 that language scores tended to be relatively stable. Not surprisingly, the most unstable measures were those for which context would be expected to be influential (e.g., % interjections and % modifiers). Comprehension measures were the least stable on Assessment 1, but from Assessments 2 to 4, correlations maintained a consistent though moderate level; the Palmer Concept Familiarity Inventory was impressively stable at both Assessments 3 and 4. The relatively low split-half reliabilities for measures of Maternal speech are rather surprising. Mother's speech to the child might be linked to the situation and to the child's behavior in the situation, thus reflecting multiple sources of situational variation.

TABLE 1

Transsituational and Temporal Stability for Language Measures

Measure	Mean Correlations	Range
Language Production[1]		
Proportion of words	.65	.43 - .75
Utterances per minute	.69	.52 - .76
Percent description	.54	.30 - .66
Percent demand object/action	.57	.33 - .69
Percent question	.39	.15 - .42
Percent answer	.42	.19 - .54
Percent interjection	.28	.10 - .39
Vocabulary[1]		
Percent nominals	.56	.49 - .73
Percent actions	.43	.38 - .62
Percent modifiers	.37	.33 - .48
Comprehension[2]		
Assessment 1	.31	
Assessment 2	.52	
Assessment 3	.51	
Assessment 4	.48	
Maternal Speech[3]		
Percent directive	.41	.29 - .65
Percent describes things	.36	.25 - .60
Percent describes child	.34	.25 - .57
Percent describes people	.24	.19 - .29
Percent interjections		
Percent questions	.40	.38 - .62
Percent complete sentences	.37	.26 - .62
Noun-verb diversity	.41	.36 - .58
Palmer Concept Familiarity Inventory[3]	.66	.61 - .71

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[1] Reliabilities computed between situations, within assessments, and averaged across assessments.

[2] Split-half reliabilities.

[3] Split-half reliabilities averaged across assessments.

Appendix DIII. Coding Forms and Test Instruments

Table 1....Observer's Record of Child's Language

Table 2....Language Scoring Sheet

Table 3....Vocabulary: Assessment 1

Table 4....Vocabulary: Assessment 2

Table 5....Comprehension Test I

Table 6....Comprehension Test II, Part I

Comprehension Test II, Part II

Comprehension Test Score Sheet

Table 7....Comprehension Tests III & IV

Comprehension Test Score Sheet

TABLE 1

Observer's Record of Child's Language

BABY'S ACTIVITY	SPEECH	INTERPRETATION	MATERNAL RESPONSE		LANGUAGE USE						INTERJECTION	IMITATION
			V	NV	DESCRIBE	DEMAND OBJ/ACT.	DEMAND INFO.	REFUSE	CALL	ANSWER		

TABLE 2

LANGUAGE SCORING SHEET

NAME ______________________ AGE ______________________

DATE ______________________

PERIOD	VOC		JARGON		?		WORDS		SENTENCES		PH	TOTAL UTT.	AVERAGE # WORDS/UTTERANCE.
	MP	MA	MP	MA	MP	MA	MP	MA	MP	MA			
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
TOTAL													

PERIOD	IMITATION	ANSWERS	INTERJECTIONS	DESCRIPTIONS	COMMUNICATION					M'S R			
					DEM OBJ/ACT	DEM INFO	REF	CALL	STERIO	REL		IRREL	
										V	NV	V	NV
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
TOTAL													

TABLE 3

Name ____________________
Date ____________________

VOCABULARY: ASSESSMENT 1

allgone ________
apple ________
baby ________
ball ________
banana ________
bear ________
belt ________
big ________
bike ________
bird ________
blanket ________
blocks ________
boat ________
book ________
boom ________
bottle ________
bow-wow ________
bread ________
bus ________
bye-bye ________
cake ________
car ________
cat ________
chair ________
cheese ________
clock ________
cold ________
coat ________

cookie ________
cow ________
crash ________
cup ________
daddy ________
dirty ________
doll ________
door ________
down ________
drink ________
duck ________
ear ________
eat ________
egg ________
eye ________
feet ________
flower ________
girl ________
God ________
go ________
good ________
happy ________
here ________
Hi ________
horse ________
hot ________
house ________
I ________

in ________
is ________
it ________
juice ________
keys ________
kitty ________
knee ________
knife ________
lady ________
leg ________
light ________
look ________
mama ________
meat ________
me ________
milk ________
mine ________
mommy ________
moon ________
more ________
mouth ________
my ________
night night ________
nice ________
no ________
nose ________
num num ________
oh ________

oh oh ________
okay ________
out ________
outside ________
ow ________
pea ________
peek-aboo ________
please ________
pot ________
pretty ________
push ________
rock ________
see ________
shoe ________
snow ________
sock ________
spoon ________
teeth ________
thank you ________
there ________
toast ________
toes ________
top ________
truck ________
up ________
watch ________
water ________
wet ________

what ____________

what's ____________

what's that ____________

whee ____________

Other words, including people's names:

____

____

____

____

____

____

____

____

____

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TABLE 4

VOCABULARY: ASSESSMENT 2

Name ______________________
Date ______________________

Circle words which mother checked:

Nominals

apple
baby
ball
banana
belt
bike
bird
blanket
blocks
boat
book
bottle
bread
bus
cake
car
cat
chair
cheese
clock
coat
cookie
cow

cup
daddy
doll
door
drink
duck
ear
egg
eye
feet
flower
girl
God
horse
house
it
juice
keys
kitty
knee
knife
lady
leg

light
mama
meat
milk
mommy
moon
mouth
nose
pea
peekaboo
pot
shoe
snow
sock
spoon
teeth
toast
toes
top
truck
watch
water

Others:

TOTAL __________

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Modifiers

big
boom
cold
crash
dirty
good
happy
hot
me
mine
my
nice
num num
oh oh
pretty
there

Others:

TOTAL____________

Actions

bow wow
bye bye
down
eat
go
here
look
more
night night
out
outside
ow
push
rock
see
whee

Others:

TOTAL__________

Miscellaneous

hi
in
is
oh
okay
please
thank you
what
what's
what's that?

Others:

TOTAL___________

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TABLE 5

NAME_______________________________

DATE_______________________________

COMPREHENSION TEST I

OBSERVER SET

Set II

INSTRUCTIONS: Present the set of 6 objects to the child. Read him the directions on the cards, in the order given, when he is not holding the object mentioned. Say his name first and repeat the instructions 3 times, if necessary. Follow the instructions on the cards.

B. Give_____me_____the bottle_____

A. Throw_____me_____more blocks_____

A. Throw_____me_____the car_____

B. Give_____me_____more telephone_____

B. Throw_____me_____the bottle_____

A. Give_____me_____the telephone_____

B. Throw_____me_____more cars_____

A. Give_____me_____more blocks_____

	Type A	Type B	Total
Total partially correct	_____	_____	_____
Total completely correct	_____	_____	_____
Total points*	_____	_____	_____

*1 point for each partially correct plus 2 points for each completely correct

TABLE 5 (cont.)

NAME_______________________________

DATE_______________________________

COMPREHENSION TEST I

MATERNAL SET

Set I

INSTRUCTIONS: Present the set of 6 objects to the child. Give the cards to his mother. Ask her to read each card, in turn, when the child is not holding the object mentioned. She should say his name first and she may repeat the instructions three times. She should follow any directions on the cards.

A. Give_____me_____the doll_____

B. Throw_____me_____more keys_____

B. Throw_____me_____the cup

A. Give_____me_____more spoons_____

A. Throw_____me_____the doll_____

B. Give_____me_____the spoons_____

A. Throw_____me_____more cups_____

B. Give_____me_____more keys_____

	Type A	Type B	Total
Total partially correct	_____	_____	_____
Total completely correct	_____	_____	_____
Total points*	_____	_____	_____

*1 point for each partially correct plus 2 points for each completely correct

TABLE 6

Name ____________________ Date ____________________

COMPREHENSION TEST II, PART I

Instructions: Give mother cards and ask her to read them to the child when she thinks he will respond. Ask her to read exactly what is on the card and to do it when the child does not have the object in his hand. Explain that she may say the child's name first and repeat the command 3 times before going on. Show her the toys and if she thinks there are some her child will not recognize, substitute small objects of the child's.

				Partially correct	Completely correct
1.	Put ______	Book ______	Table ______	______	______
2.	Give ______	More ______	Blocks ______	______	______
3.	Give ______	Empty ______	Cup ______	______	______
4.	Give ______	Dolly ______	Doggie ______	______	______
5.	Put ______	Dolly ______	Sleep ______	______	______
6.	See (look at)		The dog ______	______	______
7.	Child's name	Throw ______	Ball ______	______	______
8.	Child's name	Talk ______	Phone ______	______	______
9.	Give ______	Big ______	Car ______	______	______
10.	Give ______	More ______	Cups ______	______	______
11.	Give ______	Dolly ______	Ride ______	______	______
12.	Give ______	Mommy's ______	Purse ______	______	______

TABLE 6 (cont.)

Name ____________________ Date ____________________

COMPREHENSION TEST II, PART II

Instructions: See Part I

				Partially correct	Completely correct
1.	Give ______	Mommy ______	Box ______	______	______
2.	Put ______	Car ______	Chair ______	______	______
3.	Give ______	Dolly ______	Drink ______	______	______
4.	Give ______	O's name ______	Purse ______	______	______
5.	Give ______	Other ______	Keys ______	______	______
6.	Look at ______	Mommy ______		______	______
7.	Give ______	Dolly's ______	Shoe ______	______	______
8.	Put ______	Ball ______	Box ______	______	______
9.	Where is (looks at) Brush ______			______	______
10.	Give ______	Kitty ______	Shoe ______	______	______
11.	Give ______	Open ______	Box ______	______	______
12.	(Child's name)	Kiss ______	Dolly ______	______	______

TABLE 6 (cont.)

Name ______________________

COMPREHENSION TEST SCORE SHEET

	Partially correct	Completely correct
1. Ostensive (I, #6; II, #6, #9)	________	________
2. Attributive (I, #3, #9; II, #11)	________	________
3. Locative (I, #1; II, #2, #8)	________	________
4. Recurrance (I, #2, #10; II, #5)	________	________
5. Possession (I, #12; II, #4, #7)	________	________
6. Agent-action (I, #5, #11; II, #3)	________	________
7. Agent-object (I, #4; II, #10, #1)	________	________
8. Action-object (I, #7, #8; II, #12.)	________	________
TOTAL	________	________

TABLE 7

Name____________________________

Date____________________________

COMPREHENSION III & IV

Instructions: Give B the toys. Give M the cards and ask her to read the instructions to B. She may say B's name first and repeat each sentence 3 times. Explain that it is very important to say exactly what is on the card.

Set A

Acts	Refuses	Ignores
1. Give____me____the cup____and spoon____ Right now please.	________	________
2. Put the book____and car____and dog____ on the table____please.	________	________
3. Give____me____the large____blue____ pretty____cup now please.	________	________
4. Put the horse____along with the spoon____ in the box____please.	________	________
5. Make the cow____run____, and walk____now please.	________	________
6. Give me____the horse____and car____ if you want to.	________	________
7. Give the cup____to the doggie____ and give____him____the book____too.	________	________
8. Give the doll____and the crib____to the horse____ please.	________	________
9. Make the doll____walk____, hop____and fall____now please.	________	________
10. Give____me____the cup____with the spoon____ too please.	________	________

TABLE 7 (cont.)

Name________________________

Date________________________

Set B

Instructions: See Set A.

Acts	Refuses	Ignores
1. Put the big_____white_____picture_____book on the table____now please.	________	________
2. Put_____the brush_____and the comb_____on the chair_____when you're ready.	________	________
3. Give_____the keys_____to the dog_____when you're ready.	________	________
4. Give_____me_____the pocketbook_____and give_____ me_____the hat_____please.	________	________
5. Give_____the large_____green_____metal_____ spoon_____to the doll_____please.	________	________
6. Give_____the comb_____to the doll_____ please.	________	________
7. Make the dog_____jump,_____walk_____and bark_____right now please.	________	________
8. Put_____the spoon_____and the brush_____in the box_____right now please.	________	________
9. Give the doll_____who has a shoe_____to the dog_____.	________	________
10. Give_____me_____the book_____and brush_____ and comb_____now please.	________	________
11. Put_____the pocketbook_____in the box_____and put the spoon_____there.	________	________

TABLE 7 (cont.)

COMPREHENSION IV: SCORE SHEET

SENTENCE TYPE	PARTIALLY CORRECT	COMPLETELY CORRECT
1. Simple (Set A #1; Set B #6, #3)		
2. Additional Vocabulary (nouns) (Set A #2, #8; Set B #10)		
3. Additional Vocabulary (adjectives) (Set A #3; Set B #1, #5)		
4. Additional Vocabulary (verbs) (Set A #5, #9; Set B #7)		
5. 1 Independent + 1 Dependent Clause (Set A #6; Set B #2, #3)		
6. 2 Independent Clauses (Set A #7; Set B #4, #11)		
7. Embedded Phrase (Set A #4, #10; Set B #9)		
Total		

Appendix E: The Assessment of Social Development

EI Summary of Assessment Procedures
EII Social Assessment
EIII Recording and Coding of Measures

1. e.

Appendix EI: Social Assessment Procedures

Three different kinds of procedure were employed in the Social Assessments: (a) observation of the child's reactions to separation from the mother and to unfamiliar persons in semi-structured situations, (b) observation of "natural" unstructured mother-child interaction, and (c) presentation of preferential activities choices for the mother. All social assessments were conducted in the home.

a. Semi-structured Situations

(1) The Stranger Probe

The first assessment procedure followed in each Social Assessment visit was the so-called "stranger probe". The details varied from one assessment to the next, but the overall procedure was the same. Typically, the observer arrived at the home first and "set the stage" for the stranger's appearance by preparing the mother for what to expect and finding a comfortable and relatively clear place in which the visitor could perform. Shortly after, the stranger (an unfamiliar woman) arrived, and after introductions were made, went through a prescribed sequence of activities designed to elicit interaction from the child. Meanwhile, the observer moved to an inconspicuous position in the room and recorded her observations on a checklist form (Table El). She also managed the timing of the activities by tapping on her clipboard when it was time for the stranger to begin the next item. The stranger first sat quietly at some distance from mother and child. Then, she looked at the child, smiled and talked in a friendly and inviting way for a short time. She continued to invite the child's interaction by calling him or her, playing with an appealing toy, and, finally, by approaching him or her physically if the child had not already gone to the stranger. Once they were in close proximity, the stranger tried to engage the child, first, in interactive cooperative play with the toy, and second, in a physical-social game like peek-a-boo, horsie, piggy, etc. After some play time, she progressively "disengaged" herself from the child by not playing, going to the other side of the room, going into the next room, and leaving the house.

This basic stranger probe procedure was followed at Assessments 1 and 2. For Assessment 3, a variation, the "strange mother and baby" probe, was performed. As the name suggests, at this assessment visit the child was visited not only by an unfamiliar woman but by an unfamiliar peer as well. Twelve mothers and their 3-year old sons served as strangers for this assessment. They were randomly assigned to assessment families. As well as an "approach sequence", like that described for Assessments 1 and 2, in which the unfamiliar mother acted as the stranger, this visit included several periods of free play for the two children -- with two toys, with one toy, without toys, and with two cookies.

Another variation of the stranger probe was conducted as Assessment 4 for the children in Wave 1. (Unfortunately, it was not possible to carry out this more elaborate probe for Waves 2 and 3 as it required more research staff than were available at that time. Assessment 4 for Waves 2 and 3, therefore, repeated the standard stranger probe of Assessments 1 and 2.) This variation of the stranger probe was based on differential performance by two (adult) strangers. The first stranger was "nice" to the child: she gave the child a toy, a cookie, she smiled, praised, talked to, and played responsively with the child. Then she went through a standard sequence of activities like that in the basic stranger probe. The second stranger, by contrast, before going through the basic approach sequence of the standard stranger probe, was "nasty" to the child. She took away the toy the child was playing with and wouldn't give it back, was verbally critical and negative, frowned and scowled, ignored the child, and accused him of tearing a book.

(2) The Attachment Probe

Another semi-structured probe, this one to assess the child's relation with or attachment to his or her mother, followed the stranger probe at the Social Assessments. The mother was instructed by the observer to do the following things, item by item, again, while the observer recorded the child's social reactions. First, the mother sat at a distance from the child and ignored him or her, then, like the stranger had, she looked, smiled, and talked to the child, then called him to her, tried to engage him or her in a physical-social game, and played with the child with a toy -- in an attempt to elicit social interaction. After the play and social interaction time, the mother went through a series of separation and reunion activities: going to the other side of the room, into the next room (out of sight), returning to the child's view, then leaving once more, this time behind a closed (bathroom) door and returning, and finally leaving the house and returning. This procedure was followed for Assessments 1, 2, and 4. In Assessment 3, the strange mother and baby visit, the child's relation to his mother was observed as she ignored him while talking with the other mother, played with him, played with the unfamiliar child, left the room, as he was approached by the strange mother, when his mother returned, and when she took away his toys.

b. Unstructured Situation

The second assessment procedure followed in the Social Assessment visit was a one-hour observation of the child during his "natural" interaction with people in his home. After the stranger(s) had left the house, the mother was told that the observer wanted to see how the child played "naturally" without any intrusion or instruction from the observer, and she was asked to behave as far as possible as if the observer were not present. For the next hour the observer followed the child's activities, recording any social interaction he or she engaged in or any behavior directed toward him or her, by means of a continuous observational scheme. The child's behaviors (from a pre-established behavior repertoire, Table E2) were recorded in the right column of a stenographer's notebook, those of the other person (interactor) in the left column. Simultaneous behaviors were written on the same horizontal line; sequential behaviors, on alternate lines. A time scale was imposed by marking 10-second intervals (at the sound of a 10-second beeper) on the record. Any particular behavior was recorded only once during a 10-second period unless it was interrupted by another behavior and then resumed. A behavior that continued for more than 10 seconds was indicated by a vertical line for the duration of that behavior.

As well as recording the behavior unit (in an abbreviated code form), the observer also noted for each behavior: the actor (mother (M), father (F), sibling (S), grandmother (GM), etc.), a specifier (the specific object demanded, given, offered, or taken, the particular game played, which word was imitated, why the child cried, etc.), and whether or not the behavior was intentionally responsive (R) to the other person's behavior.

At the end of the hour observation, the observer supplemented her quantitative observational record by filling out a set of more qualitative rating scales describing the social-emotional behavior of mother and child (Table E3).

c. Activities Choices

The activities choice probe was modeled after Santostephano's (1970) miniature situations. A series of dichotomous choices were presented to the mother of activities for her to do with the child: Would you rather read the child a poem or have the observer read it to him? Would you rather play with the child with a puppet or let him play with it by himself? Tell him the story of Goldilocks and the Three Bears or play with him with a teddy bear? Teach him to count to ten or to say "please" and "thank you"?... The choices were selected to assess maternal preferences on a number of theoretically interesting dimensions: the amount of independence or autonomy the mother would allow the child, her attachment to the child, her interest in stimulating the child or developing his intellect versus playing with him or developing his social skills, and her encouragement of stereotyped sex-roles. There were 19 such choices presented to the mother. In five of those choices, after the mother had selected her prefered activity and told the observer how difficult she found the choice, she was actually asked to perform the chosen activity. During the activity that followed, the observer rated the quality of the mother-child interaction (positive emotion, kind of teaching, cooperation, responsivenes, and so on). For the other 14 choices, the mother was merely asked to indicate her preference and how easy it was for her to choose.

The activities choice probe occurred in Social Assessment 4.

Appendix EII: Social Assessment Variables

a. Interaction Variables

The variables from the unstructured home observation focussed on the spontaneous social interaction of mother and child -- and were perhaps the most critical aspect of the social assessment. They were derived from a repertoire of observable behavior units (Table E2). These behavior units, which were recorded at the time of the observation, were at the level of discrete behavior, for both mother and child. They included a range of social actions: smiles, plays game, touches affectionately, talks, hits, restrains, holds, gives, shows, plays socially with a toy, books, etc. On the basis of previous research in the Social Panel, the behavior units from the assessment observation protocols were combined and supplemented by the comparable qualitative ratings (Table E3) made at the end of the observations, to form meaningful dimensions or categories of social behavior.

For the mother, the variables thus formed were as follows -- all referring to her behavior directed toward the child:

Affection..........	a combination of caressing, smiling, praising.
Talk...............	all the mother's verbalizations to the child.
Unaccepting........	hitting or punishing, restraining or physically putting the child, criticizing, reprimanding, saying "no", giving orders.
Effectiveness......	mother's overtures to the child -- with materials, verbally, or socially -- were accepted by the child, and judged "effective" by the observer.
Responsiveness.....	immediate and positive response to the child's social expressive behavior: vocalizing, smiling, playing, giving, showing.
Social Play........	playing socially, physically, or a game.

For the child, the social interaction variables thus formed -- referring to behavior directed to the mother -- were:

Affection..........smiling, patting, positive gesture, positive vocalization.

Talk...............all the child's vocal expressions to the mother.

Responsiveness.....immediate and positive response to the mother's social-expressive behavior: talk, smile, touch, hold, play, come, give, show, offer.

-- and referring to the child's behavior to a stranger --

Social contact with observer...the combination of all the child's positive and active social behavior to the observer: holding, smiling, playing, vocalizing, positive gesture, giving, offering, showing, approaching.

The third category of interaction variable was mutual behavior of mother and child:

Same room..........amount of time mother and child spend together in the same room.

Social with objects...mother and child playing together with object, giving or offering and taking, showing and looking.

Eye-to-eye.........looking at each other.

Physical contact...holding, clinging, or touching.

Social contact.....both smiling, both talking (in same 10-second period), social playing together.

b. Stranger Variables

One of the dimensions of interest in the social development of young children is their reaction to unfamiliar or novel people. With very young children, a significant developmental phenomenon which has been observed repeatedly is that of "stranger anxiety" or "fear of strangers". In this study, with somewhat older children, we assessed not only their negative reactions to strangers, but their positive, cooperative social behavior as well. The variables derived from the stranger probe focussed on individual differences in amounts of various kinds of social behavior children direct toward unfamiliar adults in standard situations. The measures were based on a behavior checklist filled out at each step of the stranger probe procedure. Once again, the level of recording was largely that of discrete social behaviors -- facial, vocal, physical, and motoric: smiles, vocalizes, touches, goes, frowns, frets, cries, avoids. The child's behavior both to the stranger and to the mother were recorded concurrently, throughout the probe. These discrete behaviors were then combined to form broader categories or dimensions which paralleled the variables derived from the naturalistic observation, prior to analysis.

To depict the child's reaction to the stranger, the variables were:

Affection..........smiling, caressing, vocalizing positively, enjoying the game with the stranger.

Talk...............all vocalization directed to the stranger.

Physical contact...touching, holding, clinging, approaching and staying close to the stranger.

Social contact.....initiating or responding to or participating in play with the stranger, giving or showing objects.

Negative reaction..frowning at, fretting, crying, avoiding, or hitting the stranger.

For the strange mother and baby probe in Assessment 3, the variables for the child's reaction to the unfamiliar mother were identical to these for the stranger. In addition, the child's reaction to the unfamiliar peer was assessed according to the same dimensions. One further stranger variable was calculated in Assessment 4 for Wave 1: the child's differential reaction to "nice" and "nasty" strangers. A high score was given for being relatively more positive to the nice stranger and relatively more negative to the nasty stranger.

c. Attachment Variables

One of the milestones in young children's social development, according to Mary Ainsworth, John Bowlby, and others, is the child's formation of a strong emotional attachment or bond to the mother. One way of demonstrating this bond, they suggest, is by watching the child's behavior toward his mother during separation and reunion with her and during the approach of a stranger. These events were included in the episodes of the social assessment (i.e. the attachment probe -- separation and reunion -- and the stranger probe -- approach of a stranger). Also included as part of the attachment probe was the child's behavior during a standard social interaction (the approach sequence) with the mother.

Ainsworth has provided guidelines for rating children as unattached, low-attached, secure-attached, high-attached, and "mal"-attached (Ainsworth 1967). These criteria were applied to children's behavior in our structured attachment and stranger probes to provide an attachment rating, given by the observer at the end of the session.

Children's behavior toward their mothers was also recorded at each step of the structured probes, on the same checklists as were used to record their behavior toward the stranger. Thus a record of the child's social behavior to mother -- smiles, vocalizes, touches, goes to, etc. -- was obtained. These discrete behaviors were then combined into two categories, parallel to those for behavior to the stranger and behavior to the mother in the unstructured situation:

Physical contact...touching, clinging, going to and staying close to, and crying or fretting to mother when the stranger approaches.

Social contact.....combination of looking, smiling, vocalizing, caressing, responding to, and enjoying playing with and prolonging the game with mother.

d. Activities Choice Variables

The mother's preferred activities were scored along five dimensions, each score being the sum of her ease-of-choice ratings (from 0 - hard to 4 - easy) for those activities pre-selected to represent the five dimensions. The variables thus were:

Supporting the child's independence/autonomy

For example, mother would rather child play alone than with her, put on his own coat, solve his own problems.

Maternal attachment to the child

Mother would rather read to the child herself than have the observer read to him, look at magazine with child than read it herself, let child "help" her cook than do it herself.

Intellectual stimulation of the child

Mother would rather teach child skills like counting, sorting, labelling, how to use a toy, than play with him.

Social orientation

Mother would rather play social games -- Farmer in the Dell, play with puppet -- or teach social rules -- like "please" and "thank you" -- than do intellectual activities with the child.

Encouraging stereotyped sex role for child

Mother chooses sex-stereotyped toys or games like train, car, Tinker Toys, tool box -- for boy; doll, toy kitchen, purse, dress-up clothes -- for girl.

Based on ratings of aspects of the mother-child interactions during the chosen activities, several more variables were formed as well. These were:

Maternal positive emotion to the child during the activity.

Maternal teaching of the child during the activity.

Maternal school stimulation of the child during the activity.

Maternal responsiveness.

Maternal directiveness.

Child's positive emotion to the mother during the activity.

Child's cooperativeness with the mother.

Child's interest in the mother during the activity.

Appendix EIII: Social Assessment Recording and Coding of Measures

a. Semi-structured Situations

(1) Standard Stranger and Attachment Probes Episodes

Stranger Episodes:

1. The stranger arrives and is introduced to mother and child.
2. The stranger sits at some distance (approximately 12 feet) from mother and child. She then looks at, smiles and talks to the child for 1 minute.
3. The stranger calls the child to her (or goes on talking if the child has already approached her) for 1 minute.
4. The stranger plays with a toy in a socially inviting manner, looking and smiling at the child, calling him, demonstrating the toy, etc. for 2 minutes.
5. If the child has not spontaneously approached stranger by this time, stranger goes to child taking toy, and looking, smiling, talking warmly, for 1 minute.
6. Stranger tries to engage child in play with the toy, for 4 minutes.
7. Stranger stops playing, leaving toy available to the child, for 1 minute.
8. Stranger puts her arm around the child or picks him up and plays a physical-social game with him for a maximum of 2 minutes (less if child shows negative reaction).
9. Stranger stops playing, but stays near the child for 1 minute.
10. The stranger leaves the child, goes to the other side of the room, not looking at the child, for 1 minute.
11. The stranger goes into another room, still visible through the doorway, and calls the child to come to her, smiling warmly, etc., for 1 minute.

12. If the child comes to her, the stranger tries to engage in social interaction with him, for 2 minutes.
13. The stranger leaves the house, or goes into another room, while child's behavior with mother is assessed.

Attachment (Interaction and Separation) Episodes:

14. Mother sits at some distance from child (approximately 12 feet) for 1 minute, ignoring the child.
15. Mother looks at, smiles, talks to child for 1 minute.
16. Mother calls child to her (1 minute).
17. Mother tries to engage child in social interaction (physical or social game) for 2 minutes.
18. Mother plays with child with a book for 4 minutes.
19. Mother leaves child, goes to other side of room, for 1 minute.
20. Mother goes into next room, out of sight, but not behind a closed door or gate for a maximum of 2 minutes (less if child follows her).
21. Mother returns to child's room and looks at him but does not talk, play, or approach, for 1 minute.
22. Mother goes into the bathroom for 2 minutes and closes, but does not lock the door for a maximum of 2 minutes.
23. Mother returns to child's room and looks but does not talk or approach for 1 minute.
24. Mother leaves through an outside door, closing the door behind her, for a maximum of 2 minutes.
25. Mother returns, looks but does not talk or approach, for 1 minute.

(2) Strange Mother and Baby Probe Episodes:

1. Strange mother (M2) and baby (B2) arrive and are introduced to study mother (M1) and child (B1). Observer records for 1 minute.
2. Observer gives doll and truck to M1 saying "Here are the toys for

the babies to play with while you and Mrs. X sit and visit." O observes until M1 sits down.

3. Mothers sit and talk together or look at books or magazines. Children are free to play by themselves for 3 minutes.
4. Strange mother (M2) goes through "approach sequence" with B1:
   - calls, smiles, and talks to B1
   - approaches B, talking and smiling
   - touches B, talking and smiling
   - picks B up, holds, talking and smiling
   - puts B down, leaves B, goes back to chair or couch

   for 2 minutes.
5. Mothers talk together, children free to play, for 1 1/2 minutes.
6. M1 plays with B1, social game, for 2 minutes.
7. M1 plays with B2 similarly, choice of activity is always up to M1, for 2 minutes.
8. M2 offers B1 two small cookies from her position on chair or couch. If B1 does not go to M2, M2 goes to B1 and gives him cookies, then sits down again.
9. Mothers talk together, children free to play for 1 1/2 minutes.
10. M1 leaves room for 2 minutes.
11. M2 does approach sequence with B1, while M1 is still out of room:
    - calls, smiles, and talks to B1
    - approaches B, talking and smiling
    - touches B, talking and smiling
    - picks B up, holds, talking and smiling
    - puts B down, leaves B, goes back to chair or couch

    The estimated time for sequence is 2 minutes, but if B starts to follow M1 or to cry, M2 does approach sequence sooner and faster.

12. Ml returns to room, gives the children two toy telephones, while O removes doll and truck. O observes till Ml sits down.

13. Mothers talk together, children free to play, for 1 1/2 minutes.

14. Ml removes toy Bl is playing with. Mothers talk together, children play, for 3 minutes.

(3) Nice and Nasty Stranger Probe Episodes:

1. First stranger (S1) plays with child and jack-in-the-box in a stimulating manner for 2 minutes. She suggests activities, is entertaining, talks, questions child, and so on.

2. S1 waits for 1 minute, not playing with toy, looking at but not talking to child.

3. S1 plays with child and jack-in-the-box responsively for 2 minutes. She does not suggest new activities, but elaborates on child's activities, talks about what child is doing, lets child play with toy, and so on.

4. S1 waits for 1 minute.

5. S1 plays with child "nicely" for 3 minutes with blocks. Also gives child cookie, smiles, praises child, is friendly, responsive.

6. She puts blocks away, puts jack-in-the-box beside her, and waits (1 minute), looking at child.

7. She talks to child for 1 minute.

8. She plays with jack-in-the box for 1 minute.

9. She talks to child or plays physical game for 1 minute.

10. She puts toy away.

11. She says "goodbye" and goes into the next room for 1 minute.

12. She returns, and now becomes the observer for the next stranger (S2).

13-17. S2 is the "nasty" stranger. She goes through episodes 13-17 that are identical to episodes 1-4 with S1,using a ball in place of the jack-in-the-box, a book in place of the blocks.

18. During episode 18 (equivalent to S1's episode 5), however, she behaves in a "nasty" manner -- she is critical of the child, accuses him of tearing the book with which they are playing, refuses to play what he suggests, and so on.

19-24. Identical to episodes 6-11 for S1, using a ball in place of the jack-in-the-box.

25. S2 returns to the child's room. Both strangers smile at the child, not initiating any interaction, but responding appropriately if child does, for 3 minutes.

26. Both strangers ask child for a cookie (a box of cookies having been brought out by S1).

Stranger/Attachment Probes Observation Recording

For each of the stranger and attachment episodes, the following checklist of social behaviors was filled out (at 10-second intervals for the nice/nasty stranger probe; at 30-second intervals for the strange mother and baby probe; at 1-minute intervals for the standard stranger probe):

TABLE E1

OBSERVATION CHECKLIST FOR STRANGER AND ATTACHMENT PROBES

	Stranger (or Observer**)	Mother	(Strange Peer*)
Looks at			
Smiles at			
Looks away from (visually avoids)			
Frowns			
Vocalizes to			
Frets or fusses			
Cries			
Touches			
Carresses or pats affectionately			
Clings to or holds			
Aggresses against (hits, kicks, etc.) physically			
Gestures "wants"			
Goes to			
Stays close to			
Avoids physically			
Gives, offers or shows object to			
Takes object away from			
Takes object responsively			

* in Strange Mother and Baby Probe

** in attachment episodes, when stranger was not present

As well as this standard checklist, additional checklists were filled out for the "game" episodes:

Game is brief			
Game is long			
Child plays only with toy			
Child plays with toy and person			
Child plays with person socially (not mediated by toy)			
Child initiates social interaction			
Child enjoys game			
Child participates in game			
Child prolongs game			

Finally, immediately after the stranger probe procedures were completed, the observer filled out a set of rating scales, based on the child's behavior during the entire probe:

1. Child's Social Responsiveness to Stranger (5-point scale from "none" to "always enjoys and participates in interaction with stranger, approaches her spontaneously, eagerly, without coaxing").
2. Child's "Stranger Anxiety" (5-point scale from "none" to "avoids stranger, cries when approached by stranger").
3. Child's Social Responsiveness to Mother (5-point scale from "none" to "always enjoys and participates in interaction with mother").
4. Attachment (7-point scale, based on Ainsworth's categories):

A	B1	B2	B3	B4		C
Unattached	Low Attached	Not very Attached	Secure Attached	Very Attached	Over Attached	"Mal-" Attached

Rating:
1----------2----------3----------4----------5----------6----------7

A "Unattached" - The baby shows little or no tendency to seek proximity, interaction or contact with his mother. He generally ignores her, even after she returns from the other room. He may be rejecting of her. He shows no stranger anxiety, but behaves toward the stranger as he does toward his own mother.

B3 "Secure attached" - The baby is active in seeking interaction with his mother, particularly in a stressful situation, such as when she leaves the room when the stranger approaches, and so on. He uses her as a secure base from which he can venture forth to play or explore. He may or may not be friendly toward the stranger, but he obviously prefers his own mother.

B4 "Very attached" - The baby wants contact with his mother, and actively seeks it by approaching, following, clinging. He is preoccupied with his mother when she is present, and is distressed when she is absent.

C "Mal-attached" - The baby cannot use the mother as a secure base. He displays generally maladaptive behavior in the stranger situation. He is anxious and/or angry and/or rejecting -- toward mother and stranger.

Stranger/Attachment Probes Coding of Variables

Affection to stranger: Sum of frequency (from checklist) of smiles, caresses, enjoys game (X 3) with stranger.

Talk to stranger: Sum of frequency of vocalizes to stranger.

Physical contact with stranger: Sum of touches, clings, goes to, stays close to stranger.

Social contact with stranger: Sum of "wants", gives object, takes responsive, long play (X 2), plays with stranger (X 2), initiates interaction (X 3), participates in game (X 2), prolongs games (X 3), social responsiveness to stranger rating (X 3).

Negative reaction to stranger: Sum of frowns, frets, cries, aggresses, avoids, and stranger anxiety rating (X 3).

Physical contact with mother: Sum of touches, clings, goes to, stays close to, and frets or cries when mother leaves room.

Social contact with mother: Sum of looks, smil es, vocalizes, caresses, gives object, long play with mother (X 2), plays with mother (X 2), enjoys game (X 2), prolongs game (X 2), social responsiveness to mother rating (X 2).

Attachment to mother: Ainsworth rating coded from 1 (unattached) to 7 (mal-attached).

For the Nice and Nasty Stranger Probe, the variable of the child's differential reaction to strangers was calculated on the basis of the sum of the number of positive 10-second intervals with the nice stranger minus the number of positive 10-second intervals with the nasty stranger, and the number of negative 10-second intervals with the nasty stranger minus the number of negative 10-second intervals with the nice stranger.

b. Unstructured Situation

Observation Recording

TABLE E2

BEHAVIOR UNITS FOR OBSERVATIONS IN UNSTRUCTURED SITUATION

Behavior Unit	Abbreviation Used in Observation Record	Definition
Maternal:		
Holds	h	Mother physically holds, carries, or touches child.
Affectionate tactual contact	atc	Mother caresses, hugs, kisses, fondles, etc. the child. If the activity is for the purpose of soothing the child, it is called "atc-soothes".
Restrains	restr	Mother deliberately and actively restricts child's physical activity.
Attends need	attn	Mother performs caretaking function-feeding, dressing, etc.
Appropriate response (specified)	appr R	Mother makes specifically appropriate response not covered by another category behavior.
Comes room	cms rm	Mother comes into child's view.
Comes baby	cms B	Mother comes to the child (within 4 feet).
Leaves room	lvs rm	Mother leaves child's view.
Leaves baby	lvs B	Mother goes more than 4 feet away from child.
Puts	puts	Mother moves child -- puts in highchair, on floor, etc.
Looks	l	Mother looks directly at child.
Smiles	sm	Mother smiles or laughs at child.
Hits	hits	Mother inflicts physical pain on child, slaps, hits, punishes.
Gives	gives	Mother gives an object, toy or food to the child.
Offers	Offers	Mother offers object, etc. to child -- physically and/or verbally; effort on the child's part is necessary to obtain object.
Shows	shows	Mother shows an object to child -- points, demonstrates, etc.

BEHAVIOR UNITS FOR OBSERVATIONS IN UNSTRUCTURED SITUATION

Behavior Unit	Abbreviation Used in Observation Record	Definition
Maternal (continued):		
No-gives	no gives	Mother deliberately refuses to give child an object he desires.
Takes	takes	Mother takes object from child.
Plays toys	pl toy	Mother plays with child with toy or other object.
Plays physical	pl phys	Mother plays with child physically -- tickling, bouncing, etc.
Plays game	pl game	Mother plays relatively conventional game like peek-a-boo, pat-a-cake, with child.
Plays social	pl soc	Mother and child engaged in spontaneous face-to-face, happy, reciprocal interaction.
Imitates	imit	Mother imitates child's vocalization (v' imit) or physical behavior (g' imit).
Verbalization	V	Mother talks to child. If content and/or tone are especially positively affective, (e.g., praise), verbalization is called "V+"; if negative (e.g., a sharp "no" command, or a reprimand) "V-"; if a verbal demand, VD.
Expressive physical	exp	Mother gestures to child in some communicative way.
Child:		
Holds	h	The child initiates or maintains casual physical contact with the mother or another person.
Affectionate tactual contact	atc	The child expresses physical affection to a person.
Clings	clings	The child initiates or maintains intense physical contact with the mother or another person.
Expressive physical	exp	The child expresses a need, feeling, desire, etc. physically. May be exp - (e.g. temper tantrum), exp (e.g. reaching for an object), or exp + (e.g. gleeful bouncing).
Appropriate response	appr R	The child responds to a person's verbalization or gesture appropriately (e.g., does what the mother asks).
Goes M's room	goes M rm	Physically moves into view of mother.

BEHAVIOR UNITS FOR OBSERVATIONS IN UNSTRUCTURED SITUATION

Behavior Unit	Abbreviation Used in Observation Record	Definition
Child (continued):		
Goes to person	goes	Goes to mother or other person (within 4 feet).
Leaves mother	lvs M	Moves more than 4 feet away from mother.
Leaves mother's room	lvs M rm	Moves so that he is no longer within mother's sight.
Looks	l	Looks at a person.
Smiles	sm	Smiles or laughs at a person.
Gives	gives	Gives an object to some person.
Shows	shows	Shown or offers an object to a person.
Takes	takes	Takes an object, food, etc. from a person.
No-takes	no-takes	Refuses an object a person is giving or offering.
Plays toy	pl toy	Plays with an object or toy with another person.
Plays social	pl soc	Plays with a person without objects.
Cries	cries	Prolonged, intense negative vocalization, with tears.
Vocalization	v	Child babbles or says words, syllables, or sentences: "V+" if tone or content is positively affective, "V-" if negative (e.g., fret, fuss, whine), VD if a vocal demand.
imitates	imit	The child imitates another person's activity (g' imit) or words (v' imit) immediately.

For each child behavior unit, if the mother is not the object of the child's social action, the person toward whom the behavior is directed is indicated by an initial (e.g. "O" for observer). Specific objects used, games played, desires gestured, etc. are also indicated in the observation record. Each behavior unit, furthermore, is qualified with an "R" when the behavior is deliberately, and directly responsive to the other person's behavior.

2

TABLE E3

MATERNAL AND CHILD RATING SCALES FOR UNSTRUCTURED SITUATION

Maternal Rating Scales

1. Amount of positive emotion expressed (frequency of atc, tone of voice, V+...)
(none) 0--------1--------2--------3--------4 (lots)

2. Amount of negative emotion expressed (frequency of hits, angry tone, V-...)
(lots) 4--------3--------2--------3--------0 (none)

3. Acceptance of B's behavior (no restr, hits, V-, VD...)
(never) 0--------1--------2--------3--------4 (all the time)

4. Amount of physical contact (h, atc, pl phys...)
(none) 0--------1--------2--------3--------4 (lots)

5. Social stimulation (l, sm, pl soc, game...)
(none) 0--------1--------2--------3--------4 (lots)

6. Verbal stimulation (V, V+, V-, VD)
(none) 0--------1--------2--------3--------4 (lots)

7. Stimulation with materials (pl toy, shows, gives, offers...)
(none) 0--------1--------2--------3--------4 (lots)

8. Responsiveness to distress-demand (when B: V-, VD, cries, exp (wants))
(almost 0--------1--------2--------3--------4 (always, immediately)
never or very delayed)

9. Responsiveness to social signals (when B: l, sm, goes M, h, atc, exp)
(almost 0--------1--------2--------3--------4 (almost always)
never)

10. Effectiveness of social behaviors (l, sm, pl soc, V, are effective)
(almost 0--------1--------2--------3--------4 (always interests or satisfies B)
never)

11. Effectivensss of verbal behavior (V, V+, V-, VD, are effective)
(almost 0--------1--------2--------3--------4 (almost always)
never)

12. Effectiveness of behaviors with materials (pl toy, gives, shows, offers, are effective)
(almost 0--------1--------2--------3--------4 (almost always)
never)

Child Rating Scales

1. Social responsiveness to M (when M initiates game, etc.)

-2	-1	0	+1	+2	+3
avoids cries	ignores	lk only	lk, sm, briefly	sm,exp+,V+ prolonged	loves it, forever

2. Socialability to Observer

-2	-1	0	+1	+2	+3
avoids, cries	avoids at first, V-	ignores	lk, sm	lk, sm, V	tries to engage in play

Unstructured Situation Coding of Variables

Variable =	Behavior Proportions (Number of 10" intervals for given behavior unit(s), divided by total number of 10" intervals in observation) +	Behavior Ratings (Divided by the number in parentheses before adding to behavior proportion)
Maternal Variables:		
Affection	atc, V+, sm	positive emotion (1000)
Talk	V, V'imit	verbal stimulation (100)
Unaccepting	hit, V-, VD, no gives, restr, puts (not R)	negative emotion (1000)
Effectiveness		effectiveness social (1000) effectiveness verbal (1000) effectiveness materials (1000)
Social Play	pl soc, pl phys, pl game	social stimulation (1000)
Child Variables:		
Affection to Mother	sm, atc, V+, exp + -- to M	
Talk to Mother	V, V'imit, VD -- to M	
Social contact with observer	h, sm, pl, V, exp, gives, shows -- to O	social to observer (1000)
Mother-child Interaction Variables:		
Same room	M & C in same room, calculated by cms and lvs rm	
Social with objects	M or C gives, takes R, shows, offers, pl w/obj	stimulation with materials (1000)
Eye-to-Eye	M and C l at each other	
Physical contact	M or C h, atc, cling	physical contact (1000)
Social contact	M and C sm, V+, V, pl	

Maternal Responsiveness: when the child performed a social expressive behavior directed toward the mother (i.e. sm, V, V+, goes, exp, exp+, gives, shows, atc, h) then, in the same or the next 10-second interval, the mother responded appropriately (i.e. l R, sm R, pl R, imit, V R, V+ R, h R, atc R, takes R, or appr R).

Child Responsiveness to Mother: when the mother directs a social-expressive behavior to the child (i.e. sm, V, V+, gives, offers, shows, atc, h, pl, cms B), then within the same or the next 10-second interval, the child responds appropriately (i.e. l R, sm R, pl R, imit, V R, V+ R, h R, atc R, takes R, appr R, exp+ R).

C. Activities Choices Probe
Observation Recording

Activities Choices:

Mother chooses between the following pairs of activities to do with the child:

1. (a) Read to child out of book (The Little Engine that Could) or
(b) let him paint-with-water. (Mother is shown the two books before choosing).

2. (a) Read child a poem (by A. A. Milne or
(b) have observer read it to child. (Mother is shown poem before choosing).

3. (a) Play with child with a puppet or
(b) let him play with puppet by himself. (Mother is shown puppet before choosing).

4. (a) Tell child the story of Goldilocks and the Three Bears or
(b) play with child with a teddy bear.

5. (a) Teach child to sort beads into two colors or
(b) teach him to play "Farmer in the Dell".

6. (a) Teach child to count to ten or
(b) teach him to say "please" and "thank you".

7. (a) Teach child to make patterns with drinking straws or
(b) teach him to blow bubbles. (Mother is shown straw patterns and bubbles).

8. (a) Help child put on his coat or
(b) let him put on coat by himself.

9. (a) Give child a car to play with or
(b) give him a doll to play with.

10. (a) Look at Redbook (magazine) by herself alone or
(b) entertain child with magazine.

11. (a) Let child "help" her while she is cooking or cleaning or
(b) do the cooking and cleaning by herself.

12. (a) Give child an electric train for his next birthday or
(b) give him a toy kitchen, with an oven that "works".

13. (a) Draw a picture for the child or
(b) let child play with paper and crayons while she watches.

14. (a) Let child play with Tinker Toys or
(b) let child play with dress-up clothes.

15. (a) Let child play with toy horn or
(b) show child how to play with horn. (Mother is shown horn before choosing).

16. (a) Show the child how a jack-in-the-box works or
(b) tell him how it works. (Mother is shown jack-in-the-box before choosing).

17. (a) Use a book to teach the child labels for pictures or objects or
(b) entertain him with a story.

18. (a) Show child how to open purse or tool box or
(b) let him figure it out by himself. (Mother is shown purse and tool box, and child has a chance to play with the toys before mother chooses).

19. (a) Play with child with purse or
(b) play with child with tool box.

Rating Scales:

For each choice mother indicates how easy or difficult the choice is for her to make. This "ease of choice" statement was recorded on rating scales from very difficult (0) to very easy (4).

For some choices (3, 7, 13, 15 and 18) mothers were asked to perform the activity they had selected. During the time the mothers and children were doing the activity, the observer rated the quality of the mother-child interaction on the following scales (each a 5-point scale from 0 to 4):

Amount of maternal teaching
Amount of maternal social stimulation
Child's social interest in mother
Child's cooperative participation in activity
Mother's responsiveness to child

Activities Choices Probe Coding of Variables

For coding the variables in the activities choices probe, mothers' ease of choice ratings for relevant items were summed:

Variable:	Sum of choices:
Supporting child's independence/autonomy	1 b, 3 b, 8 b, 12 b, 15 a, 18 b
Maternal attachment to the child	2 a, 10 b, 11 a
Intellectuil stimulation of the child	1 a, 5 a, 6 a, 7 a, 16 b, 17 a
Social orientation	3 a, 4 b, 5 b, 6 b, 7 b, 16 a, 17 b
Encouraging stereotyped sex role for child	For boys' mothers: 9 a, 12 a, 14 a, 19 b For girls' mothers: 9 b, 12 b, 14 b, 19 a

The ratings of mother-child interaction were the means of the ratings for the individual activities that were performed.

Appendix F: The Data

TABLE 1 Standardized Scores on the Bayley Mental Scales (12-24 months) and the Stanford-Binet (30 Months)
TABLE 2 Stability Coefficients - Bayley and Binet Scores
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Appendix F, The Data

TABLE 14 Within-Cell Correlations at 30 Months for Boys and Girls

TABLE 15 Mean Scores: Maternal Elaborative Play as a Function of Household Organization, Treatment Contrast, and Age

TABLE 16 Mean Scores: Core Curricula, Family Network, and Age

TABLE 17 Baby Only vs Mother Only Contrast: Mean Scores for Maternal and Child Behaviors Which Vary as a Function of Family Factor, Age and Dyadic Treatment Group

TABLE 18 Mean Scores Maternal Dominance as a Function of Family Network, Intervention Style and Age

TABLE 19 HV vs TO Contrast: Mean Scores Maternal Passive - Responsiveness as a Function of Family Network, Age and Home Visit - Test Only Contrast

TABLE 20 Pretest Ability and SES Indices: Mean Scores for Curriculum Groups

Appendix F, TABLE 1

Standardized Scores on the Bayley Mental Scales (12 - 24 months) and the Stanford-Binet (30 months)

	Age (months)					F-ratio
	12	18	24	30	$\bar{X}$	
Boys	98.64	93.43	94.93	97.05	96.01	Sex: 11.58**
Girls	101.76	106.56	104.86	102.57	103.94	S x A: 3.58*

*$p < .025$, $df = 3, 261$

**$p < .005$, $df = 1, 88$

Appendix F, TABLE 2

Stability Coefficients - Bayley and Binet Scores

	Age (months)		
	12	18	24
All Children (N = 100)			
18	.30**		
24	.29**	.73***	
30	.25*	.58***	.67**
Boys (N = 48)			
18	.38**		
24	.42**	.76***	
30	.28	.61**	.59***
Girls (N = 52)			
18	.18		
24	.16	.65**	
30	.20	.52***	.73***

*$p < .05$

**$p < .01$

***$p < .001$

Appendix F, TABLE 3

Measures Used in the Factor Analyses[a]

Child Measures

1. Proportion of words (D)
2. % Descriptive speech (D)
3. % Demands (D)
4. % Questions (D)
5. % Answers (D)
6. % Interjections (D)
7. % Utterances per minute (D)
8. Comprehension (D)
9. % Nominals (D)
10. % Modifiers (D)
11. % Action words (D)
12. Play maturity index[b] (C)
13. Level 1 activities (C)
14. Level 2 + Level 3 activities (C)
15. Pretend (C)
16. Social object actions (C)
17. Tempo of play (C)
18. Object diversity (C)
19. Focal object involvement (I; C)
20. Narrowness of preference (I-II; C)
21. Executive failure (C)
22. Positive affect (lab; C)
23. Negative affect (lab; C)
24. Look M (lab; C)
25. Look O (lab; C)
26. Expressive behavior (M-lab; C)
27. Contact object (WR-lab; C)
28. Distance M (WR-lab; C)
29. Sociability to O (home; E)
30. Talk M (home; E)
31. Affection M (home; E)
32. Responsiveness to M's social behavior (home; E)
33. Preference M (home; E)
34. Bayley-Binet scores

Appendix F, TABLE 3 (continued)

Measures Used in the Factor Analyses

Maternal Measures

1. Maternal response to child speech (U+NU;D)
2. % Directives (D)
3. % Describes people (D)
4. % Describes things (D)
5. % Interjections (D)
6. % Question style (D)
7. Noun-verb diversity (D)
8. Complete sentences (SAAD + Neg; D)
9. Complete questions (D)
10. Elaborative play style (C)
11. Play entries per minute (C)
12. Social stimulation (E)
13. Verbal stimulation (E)
14. Effectiveness (S+V+M; E)
15. Unaccepting (E)
16. Responsiveness to C's social behavior (E)
17. Sustained sociability (M soc R per C soc M; E)
18. Mutual soc.-obj. exchange (E)
19. Mutual social contact (E)
20. Same room time (E)

[a] See Appendices C, D and E for complete descriptions of the variables. The appendix which contains the relevant information is given in parentheses.

[b] A measure which takes into account the maturity and frequency of the child's activity: PMI = 1 (Level 1) + 2 (Level 2) + 3 (Level 3 + P)/No. of activities.

Appendix F, TABLE 4

Temporal Stabilities: Child Factors

		Age (months)		
		18	24	30
1. Functional SS Competence	12	.09	.07	.25*
	18	--	.36***	.23*
	24		--	.28**
2. Sustained Problem Solving	12	.37***	.04	.08
	18		.15	.11
	24			.04
3. Specific vs. Diversive Exploration	12	.28**	.17	.11
	18		.23*	.05
	24			.09
4. Social Interaction-Preference M (Home)	12	.13	.17	.01
	18		.23*	.12
	24			.21*
5. Social Interaction-Proximity M (Lab.)	12	.39**	.24**	.28**
	18		.35***	.35***
	24			.17
6. Test Competence	12	.10	.32***	.15*
	18	--	.50***	.41***
	24		--	.44***

* $p \leq .05$
** $p \leq .025$
*** $p \leq .01$

[a] Stability coefficients are based on within cell correlations which take account of sex and curriculum group.

Appendix F, TABLE 5

Temporal Stabilities: Maternal Factors

		Age (months)		
		12	18	24
1. M. Sociability				
	18	.29*		
	24	.12	.36**	
	30	.23*	.23*	.16*
2. M. Language Style: Directives vs. Questions				
	18	.28**		
	24	.27**	.12	
	30	.07	.24*	.09
3. M Social Mutuality				
	18	.05		
	24	.03	.24*	
	30	-.18	.11	.18
4. M. Articulate-Non Directiveness				
	18	.19		
	24	.02	.21*	
	30	.10	.21*	.13
5. M. Non-Verbal Intrusiveness				
	18	.05		
	24	.03	.25*	
	30	.05	.16	.31**

continued

Appendix F, TABLE 5 (continued)

Temporal Stabilities: Maternal Factors

		Age (months)		
		12	18	24
6. M. Dominance				
	18	.30**		
	24	.12	.25*	
	30	.39***	.12	.13
7. M. Passive-Responsiveness				
	18	.21*		
	24	.15	.24*	
	30	.17	.27	.33**
8. M. Elaborative Play Style				
	18	.16		
	24	.15	.18	
	30	.26*	.20*	.05

* $p < .05$

** $p < .01$

*** $p < .001$

Appendix F, TABLE 6

Curriculum x Age Effects for Children: Mean Factor Scores[a]

	Age (months)				Contrast/ Trend	F-ratio	p-value
	12	18	24	30			
C. Functional SS Competence:							
Language	-1.34	-.29	1.11	.69	L vs. P vs. S[b]	1.97	.07
Play	-1.20	-.26	.92	.83	Quadratic	5.65	.005
Social	-1.32	-.63	.62	.83			
Baby Only	-1.22	-.52	.73	.92			
Mother Only	-1.24	-.51	.84	.83			
Test Only	-1.28	-.27	.78	.88			
C. Interaction-Proximity M. (Lab):							
Language	-.37	.41	.05	.18	L vs. P vs. S	2.16	.05
Play	.04	-.16	.52	.18	Cubic	4.32	.02
Social	-.02	-.12	.14	-.34			
Baby Only	-.09	.14	.39	-.23			
Mother Only	-.39	.03	-.02	-.48			
Test Only	-.06	.03	.22	-.20			
C. Test Competence:							
Language	.44	.05	-.18	.12	D vs. T[c]	3.75	.01
Play	.14	.14	-.10	-.56	Linear	5.04	.03
Social	.02	-.23	.07	-.49	Cubic	7.99	.01
Baby Only	.18	.21	.02	.76			
Mother Only	.07	.01	-.42	.09			
Test Only	-.02	.13	-.14	-.15			

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[a] Raw Scores; [b] df (contrast) = 6/172; df (trend) = 2/88

[c] df (contrast) = 3/86 ; df (trend) = 1/88

Appendix F, TABLE 7

Curriculum x Age Effects for Mothers: Mean Factor Scores[a]

Mother Factor	Age (months)				Contrast/ Trend	F-ratio	P-value
	12	18	24	30			
M. Directs vs. Questions:							
Language	.35	.47	-.12	-.72	HV vs. TO[b]	2.34	.07
Play	.14	.34	.18	-.64	Quadratic	6.77	.01
Social	.39	.53	-.33	-.39			
Baby Only	.24	.34	-.45	-.91			
Mother Only	.58	.59	.51	-.77			
Test Only	.40	.27	-.43	-.40			
M. Dominance:					D vs. T[b]	2.10	ns
Language	.37	.51	.08	-.11	Cubic	5.53	.02
Play	-.18	.10	-.12	-.51			
Social	-.11	.07	.09	-.60			
Baby Only	.21	.03	-.03	-.57			
Mother Only	.61	.08	.53	-.38			
Test Only	.08	.24	.45	-.61			
M. Articulate-Nondirective:					L vs. P vs. S[c]	1.614	ns
Language	-.71	.01	.46	1.15	Linear	2.91	.06
Play	-.68	.03	.50	.87	Quadratic	3.36	.04
Social	-.78	.15	.40	.12			
Baby Only	-.93	-.39	.32	.06			
Mother Only	-.77	-.13	.12	.45			
Test Only	.84	-.09	.30	.40			

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[a] Raw Scores
[b] df(contrast) = 3/86; df (trend) = 1/88
[c] df(contrast) = 6/172; df (trend) = 2/88

Appendix F, TABLE 8

Maternal Sociability and Child Test Competence: Cross-lagged, Contemporaneous, and Autocorrelations between 12 and 24 Months[a]

		All Children N = 100	Boys N=24	Girls N=52
Cross-lagged Correlations:	C12/M24	.02	.05	-.05
	M12/C24	.35***	.23	.47***
Contemporaneous Correlations:	C12/M12	.02	.00	.07
	C24/M24	.09	.02	.03
Autocorrelations:	C12/C24	.32***	.42	.23
	M12/M24	.12	.11	.10
Partial Correlation[b]:		.36***	.25	.48
No Cause Comparison[c]:		.02	.00	.01
z Difference between Cross-lagged Correlations[d]:		2.41**	.88	2.80***
z Difference between Cross-lagged Correlations and	C12/M24	.00	.24	.30
No Cause Comparison[d]:	M12/C24	2.41**	1.11	2.50**

*p .05
**p .025
***p .005

[a] Based on within cell correlations taking into account sex and curriculum.

[b] Controlling for child test competence at 12 months.

[c] The average of the two contemporaneous correlations attenuated for the internal reliability of M. Soc. and C.T.C. A conservative estimate of *r* = .70 based on 6 month correlations and the reliabilities of individual measures.

[d] Fisher's *z* transformation.

Appendix F, Table 9

Within-Cell Correlations at 12 and

18 Months for All Children

12 Months	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS	-0.251									
CF3 S D FX	-0.204									
CF4 I PM H	-0.265									
CF5 I PM L	-0.234			-0.235						
CF6 TCOMP		0.215								
MF1 SOCIAB	-0.229	0.264		0.346						
MF2 LANGS										
MF3 SOCMUT				0.413			-0.228			
MF4 M ART										
MF5 VREENF			0.255					-0.258		0.203
MF6 DOMIN										0.335
MF7 PASSR	-0.528									
MF8 MELAB		0.407								-0.284
BAYLEY			0.256			0.664				
DEMOG 1					0.200				-0.297	
DEMOG 2										

12 Months	MF5	MF6	MF7	MF8	BAYLEY
MF5 VREENF					
MF6 DOMIN					
MF7 PASSR					
MF8 MELAB					
BAYLEY				0.308	
DEMOG 1					
DEMOG 2					

18 Months	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS	-0.275									
CF3 S D FX										
CF4 I PM H										
CF5 I PM L	-0.226									
CF6 TCOMP										
MF1 SOCIAB	-0.207			0.453	0.237	0.229				
MF2 LANGS				-0.239		-0.285				
MF3 SOCMUT		-0.225		0.774		0.304	0.244			
MF4 M ART									-0.235	
MF5 VREENF										0.321
MF6 DOMIN	0.275						-0.225			
MF7 PASSR				-0.238			-0.228		-0.201	
MF8 MELAB		0.204	-0.219		0.205	-0.212				
BAYLEY	0.223			0.245		0.681	0.249		0.218	
DEMOG 1		0.270						-0.263		
DEMOG 2	-0.200					-0.253			-0.279	

18 Months	MF5	MF6	MF7	MF8	BAYLEY
MF5 VREENF					
MF6 DOMIN					
MF7 PASSR					
MF8 MELAB					
BAYLEY					
DEMOG 1				0.288	
DEMOG 2	-0.278		-0.280	0.222	-0.212

Appendix F, Table 10

Within-Cell Correlations at 24 and 30 Months for All Children

24 Months	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCPMB										
CF2 SUSTPS	-0.482									
CF3 S I EX										
CF4 I PM H	0.266									
CF5 I PM L		-0.207								
CF6 TCIMD		0.212								
MF1 SOCIAB				0.654						
MF2 LANGS				0.206						
MF3 SOCMUT				0.591	-0.205	0.355				
MF4 M ART							0.254	0.237		
MF5 VEFENF								-0.215		
MF6 DCMIN				-0.300			-0.205			
MF7 PASSP										
MF8 MELAB	-0.358	0.236								
BAYLEY	0.409			0.330		0.639			0.261	
DEMOG 1						0.228				
DEMOG 2			-0.245				-0.218	0.225		

24 Months	MF5	MF6	MF7	MF8	BAYLEY
MF5 VEFENF					
MF6 DCMIN					
MF7 PASSP					
MF8 MELAB					
BAYLEY					
DEMOG 1					0.218
DEMOG 2	-0.22[illegible]		-0.238		

30 Months	CF1	CF2	CF3	CF4	CF5 I	CF6	MF1	MF2	MF3	MF4
CF1 SSCPMB										
CF2 SUSTPS	-0.397									
CF3 S I EX	-0.247	0.205								
CF4 I PM H										
CF5 I PM L	-0.332	0.283								
CF6 TCIMD					-0.238					
MF1 SOCIAB				0.674						
MF2 LANGS										
MF3 SOCMUT	0.275			0.469		-0.215				
MF4 M ART								0.401	-0.204	
MF5 VEFENF	0.322	-0.323								0.267
MF6 DCMIN	-0.202						0.256	-0.3[illegible]5		
MF7 PASSP						0.207				
MF8 MELAB										
		0.283				0.506				
DEMOG 1										
DEMOG 2										

30 Months	MF5	MF6	MF7	MF8	
MF5 VEFENF					
MF6 DCMIN					
MF7 PASSP					
MF8 MELAB	0.225				
			0.328	0.292	
DEMOG 1			0.253		
DEMOG 2			-0.218		-0.228

Appendix F, Table 11

Within - Cell Correlations at 12 Months for

Boys and Girls

Boys	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS	-0.467									
CF3 S P EX	-0.301									
CF4 I PM H	-0.220	0.300								
CF5 I PM L	-0.296			-0.335						
CF6 TCOMP		0.385	0.221							
MF1 SOCIAB	-0.388	0.491		0.582						
MF2 LANGS							-0.258			
MF3 SOCMUT	-0.200			0.513	-0.244					
MF4 M ART			-0.292	-0.254						
MF5 VPEENF			0.312					-0.405		
MF6 DOMIN							0.235	-0.353		0.269
MF7 PASSR	-0.403			0.258			0.266		0.201	
MF8 MELAB	-0.402	0.435	0.245		0.317	0.219	0.229	-0.204		-0.203
BAYLEY		0.249	0.420			0.743				
DEMOG 1				-0.288					-0.347	
DEMOG 2	0.287			-0.217					-0.401	

Boys	MF5	MF6	MF7	MF8	BAYLEY
MF5 VREENF					
MF6 DOMIN					
MF7 PASSR		0.294			
MF8 MELAB					
BAYLEY				0.220	
DEMOG 1					
DEMOG 2			-0.334		

Girls	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS										
CF3 S D EX										
CF4 I PM H	-0.296									
CF5 I PM L	-0.303									
CF6 TCOMP				-0.343						
MF1 SOCIAB										
MF2 LANGS			0.428							
MF3 SOCMUT				-0.357		-0.220	-0.357			
MF4 M ART					0.319					
MF5 VPEENF			0.214				-0.264			0.430
MF6 DOMIN						-0.439				0.415
MF7 PASSR	-0.636						-0.214			
MF8 MELAB		0.382			-0.204					-0.368
BAYLEY						0.563			-0.206	-0.285
DEMOG 1					0.209				-0.247	
DEMOG 2										

Girls	MF5	MF6	MF7	MF8	BAYLEY
MF5 VREENF					
MF6 DOMIN					
MF7 PASSR					
MF8 MELAB		-0.243			
BAYLEY	-0.335	-0.312		0.405	
DEMOG 1					0.207
DEMOG 2					

Appendix F, Table 12

Within - Cell Correlations at 18 Months

for Boys & Girls

Boys	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS	-0.201									
CF3 S O EX										
CF4 I PM H										
CF5 I PM L				0.206						
CF6 TCOMP				0.286						
MF1 SOCIAB	-0.404			0.498	0.439					
MF2 LANGS				-0.564		-0.228	-0.256			
MF3 SOCMUT			0.213	0.812		0.341	0.261	-0.326		
MF4 M ART								0.323		
MF5 VREENF				-0.205						0.307
MF6 DOMIN	0.296				-0.322		-0.331			
MF7 PASSR				-0.407			-0.304		-0.373	
MF8 MELAB		0.405	-0.288		0.235	-0.289			-0.210	
BAYLEY				0.219		0.754			0.240	
DEMOG 1		0.305			0.247			-0.237		
DEMOG 2	-0.235									

Boys	MF5	MF6	MF7	MF8	BAYLEY
MF5 VREENF					
MF6 DOMIN	-0.227				
MF7 PASSR		0.231			
MF8 MELAB					
BAYLEY					
DEMOG 1				0.531	
DEMOG 2	-0.334	0.287	-0.289		

Girls	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS	-0.330									
CF3 S O EX										
CF4 I PM H	0.226	-0.208	0.213							
CF5 I PM L	-0.338			-0.241						
CF6 TCOMP										
MF1 SOCIAB				0.419		0.335				
MF2 LANGS	-0.238		0.201			-0.345				
MF3 SOCMUT		-0.287		0.747	-0.201	0.272	0.229			
MF4 M ART				-0.226	0.213	-0.215			-0.286	
MF5 VREENF										0.335
MF6 DOMIN	0.295					0.258				
MF7 PASSR										
MF8 MELAB	0.200									
BAYLEY	0.259			0.271		0.600	0.383			
DEMOG 1		0.237				0.334		-0.238		
DEMOG 2		0.233	-0.224	-0.212		-0.376			-0.369	

Girls	MF5	MF6	MF7	MF8	BAYLEY
MF5 VREENF					
MF6 DOMIN					
MF7 PASSR					
MF8 MELAB					
BAYLEY				0.273	
DEMOG 1					
DEMOG 2	-0.228	-0.206	-0.273	0.311	-0.297

Appendix F, Table 13

Within - Cell Correlations at 24 months

for Boys and Girls

Boys	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS	-0.539									
CF3 S D EX										
CF4 I PM H	0.307									
CF5 I PM L		-0.349								
CF6 TCCMP		0.328								
MF1 SOCIAB	0.224			0.663						
MF2 LANGS	-0.275			0.302						
MF3 SOCMUT	-0.253			0.556		0.344	-0.234	-0.307		
MF4 M ART	0.214			0.291		0.341	0.273	0.330		
MF5 VREENF	0.231	-0.222			-0.241	-0.250				
MF6 DOMIN	-0.202			-0.274		0.208				0.231
MF7 PASSR						0.270				
MF8 MFLAB	-0.256				0.350	0.202			-0.207	
BAYLEY	0.325			0.405		0.426	0.326		0.341	
DEMOG 1	0.239					0.293		-0.290		
DEMOG 2	-0.217		-0.246					0.325	-0.203	

Boys	MF5	MF6	MF7	MF8	BAYLEY
MF5 VREENF					
MF6 DOMIN					
MF7 PASSR					
MF8 MFLAB					
BAYLEY		-0.214	0.306		
DEMOG 1			0.235		0.33[illegible]
DEMOG 2	-0.278		-0.207	0.277	-0.378

Girls	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS	-0.427	0.456								
CF3 S D EX										
CF4 I PM H	0.224									
CF5 I PM L				0.206						
CF6 TCOMP	0.340			0.299						
MF1 SOCIAB				0.650						
MF2 LANGS			0.295		-0.223					
MF3 SOCMUT		-0.219		0.650	-0.310	-0.364				
MF4 M ART							0.232		-0.359	
MF5 VREENF								-0.240	-0.263	
MF6 DOMIN		0.276		-0.336			-0.260	-0.243	-0.207	
MF7 PASSR			0.200		-0.503					
MF8 MFLAB	-0.471	0.370								
BAYLEY	0.495			0.231		0.847			0.202	
DEMOG 1										
DEMOG 2			-0.253	-0.209			-0.296			

Girls	MF5	MF6	MF7	MF8	BAYLEY
MF5 VREENF					
MF6 DOMIN					
MF7 PASSR					
MF8 MFLAB					
BAYLEY					
DEMOG 1					
DEMOG 2			-0.298		

Appendix F, Table 14

Within - Cell Correlations at 30 Months

for Boys and Girls

Boys	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS	-0.278									
CF3 S D FX		0.254								
CF4 I PM H	0.321									
CF5 I PM L	-0.257	0.259								
CF6 TCOMP										
MF1 SOCIAB	0.309	-0.252		0.635						
MF2 LANGS										
MF3 SOCMUT	0.400		-0.247	0.505						
MF4 M ART	0.218				0.275	0.269		0.515		
MF5 VREENF	0.340	-0.334			0.283				0.313	0.337
MF6 DOMIN								-0.221		
MF7 PASSR								0.289		
MF8 MELAB					0.262	0.365				
B.		0.348	0.237			0.633				0.244
DEMOG 1					0.263					0.222
DEMOG 2								0.259	0.265	

Boys	MF5	MF6	MF7	MF8	B.
MF5 VREENF					
MF6 DOMIN					
MF7 PASSR					
MF8 MELAB		0.256			
B.		-0.213	0.214		
DEMOG 1					
DEMOG 2				0.280	

Girls	CF1	CF2	CF3	CF4	CF5	CF6	MF1	MF2	MF3	MF4
CF1 SSCOMP										
CF2 SUSTPS	-0.450									
CF3 S D FX	-0.230									
CF4 I PM H										
CF5 I PM L	-0.403	0.312								
CF6 TCOMP				-0.210	-0.338					
MF1 SOCIAB	-0.205			0.710						
MF2 LANGS										
MF3 SOCMUT	0.210			0.447		0.347				
MF4 M ART								0.309	-0.335	
MF5 VREENF	0.324	-0.321			-0.216		-0.212			
MF6 DOMIN	-0.306	0.250		0.334			0.411	-0.456		
MF7 PASSR			-0.258			0.258				
MF8 MELAB	0.235									
B.		0.235				0.400			0.204	
DEMOG 1		0.258				0.299				
DEMOG 2				-0.384		-0.216			-0.463	

Girls	MF5	MF6	MF7	MF8	B.
MF5 VREENF					
MF6 DOMIN					
MF7 PASSR					
MF8 MELAB	0.307	-0.202			
B.			0.426		
DEMOG 1			0.324		0.283
DEMOG 2			-0.324		-0.272

Appendix F, Table 15

Mean Scores: Maternal Elaborative Play as a Function of Household Organization[a], Treatment Contrast, and Age

	Age (Months)						
	12	18	24	30	F-ratios		df
Language vs Play vs Social:							
High F2-LH					M.V.	2.92**	6/172
Language	-.26	.91	.74	.15			
Play	-.27	.20	.65	.45			
Social	-.45	.18	.12	.51	Quad	4.89**	2/88
Low F2-SH							
Language	-.03	-.41	.15	.65			
Play	-.51	.08	-.24	-.39			
Social	-.40	.29	.08	-.72			
Home Visit Groups vs Test Only:							
High F2-LH							
HV Gps	-.41	.47	.39	.07	M.V.	3.02*	3/86
TO Gp	.27	.09	.39	-.62	Linear	8.97**	1/88
Low F2-SH							
HV Gps	-.30	.12	-.05	-.09			
TO Gp	-.65	-.28	.11	.16			

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* p .05

** p .01

[a] LH = Large Household; SH = Small Household

Appendix F, Table 16

Mean Scores: Core Curricula, Family Network[a], and Age

	Age (Months)						
	12	18	24	30	F-ratios		df
C. Social Interact-Pref M							
High F1-EN					M.V.	2.11*	6/172
Language	.060	.608	.471	.126			
Play	-.102	.482	.424	-.432	Linear	3.30*	2/88
Social	-.352	-.075	.069	.995			
Low F1-RN					Quad	4.01**	2/88
Language	.614	-.079	-.053	-.005			
Play	-.263	-.201	-.650	.062			
Social	.040	.041	-.155	-.636			
M. Elaborative Play							
High F1-EN					M.V.	2.29*	6/172
Language	-.228	1.003	.905	.340	Cubic	2.62*	2/88
Play	-.187	.014	.338	.114			
Social	-.402	-.266	.551	-.773			
Low R1-RN							
Language	-.115	-.069	.223	.387			
Play	-.569	.285	.187	.056			
Social	.190	.508	-.192	.178			
M. Social Mutuality							
High F1-EN					M.V.	2.73**	6/172
Language	.914	-.274	-.673	-.374	Cubic	5.76***	2/88
Play	.541	.317	-1.118	.394			
Social	.935	.238	-.093	-.853			
Low F1-RN							
Language	.047	-.033	-.611	.156			
Play	-.069	.124	.431	.088			
Social	-.059	.479	-.116	.339			

* $p \leq .05$
** $p \leq .025$
*** $p \leq .01$

[a] EN = Extended Network; RN = Restricted Network

Appendix F, Table 17

Baby Only vs Mother Only Contrast: Mean Scores for Maternal and Child Behaviors Which Vary as a Function of Family Factor, Age and Dyadic Treatment Group

	Age (Months)				F-ratio		df
	12	18	24	30			
C. Test Competence							
High F2-LH[a]							
BO	.561	-.113	-.231	1.208	M.V.	5.34	3/86
MO	-.212	.243	-.580	-.339			
Low F2-SH[a]					Quad	11.77	1/88
BO	.037	.333	.110	.592			
MO	.373	-.253	-.249	.500			
M. Passive Responsiveness					M.V.	2.79	3/86
High F1-EN[b]					Cubic	5.06	1/88
BO	.198	.172	-.927	.945			
MO	-.559	-.103	-.708	.576			
Low F1-RN[b]							
BO	-.067	-.750	-.647	.000			
MO	.332	.432	-.660	.588			

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* $p \leq .05$

** $p \leq .01$

[a] LH = Large Household; SH = Small Household

[b] EN = Extended Network: RN = Restricted Network

Appendix F, Table 18

Mean Scores Maternal Dominance as a Function of Family Network[a], Intervention Style and Age.

	Age (Months)						
	12	18	24	30			
M. Dominance					F Ratios		df
High F1-EN							
Triadic	-.44	.25	-.21	.54	M.V.	2.69*	3/86
Dyadic	.49	-.04	.30	-.48	Cubic	5.88**	1/88
Low F1-RN							
Triadic	.35	.23	.19	-.29			
Dyadic	.28	.23	.14	-.47			

* p .05

** p .025

[a] EN = Extended Network; RN = Restricted Network

Appendix F, Table 19

HV vs TO Contrast: Mean Scores Maternal Passive - Responsiveness as a Function of Family Network[a], Age, and Home Visit - Test Only Contrast

	Age (Months)						
	12	18	24	30	F Ratios		df
M. Passive Responsiveness							
High F1-EN					M.V.	2.74*	3/86
HV Gps	-.21	.24	-.72	.73			
TO	-.08	-.41	-.29	.99	Cubic	6.30**	1/88
Low F1-RN							
HV Gps	.36	-.08	-.53	.41			
TO	.28	-.16	-1.03	-.09			

* $p \leq .05$

** $p \leq .01$

[a] En = Extended Network; RN = Restricted Network

Appendix F, TABLE 20

Pretest Ability and SES Indices:

Mean Scores for Curriculum Groups

		Language	Play	Social	Baby Only	Mother Only	Test Only	$\overline{X}$
C's 12 mon. Bayley Mental	$\overline{X}$	107.0	97.4	94.2	98.6	100.4	97.8	99.2
	SD	13.3	17.3	16.7	16.9	11.3	19.8	
M's PPVT	$\overline{X}$	115.6	118.1	113.8	115.6	115.2	112.1	115.1
	SD	14.8	17.02	11.3	15.6	12.7	20.0	
M's WAIS Perf. IQ	$\overline{X}$	101.8	101.9	96.9	102.6	98.3	103.9	100.9
	SD	10.4	11.48	11.25	10.4	10.5	14.0	
$_{MF}\overline{X}$ Employment[a] Index	$\overline{X}$	1.5	1.7	1.5	1.5	1.5	1.5	1.5
$_{MF}\overline{X}$ Education[b] Index	$\overline{X}$	1.1	1.3	1.1	1.3	1.0	1.0	1.1
	N	16	16	18	18	15	16	

[a] Unemployed = 0; Blue Collar = 1; White Collar = 2

[b] Less than high school = 0; High School Only = 1; More Than High School = 2.